

1044b UIC - EAST POPLAR OIL FIELD
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Region 8



13662

HISTORY

MURPHY CORPORATION
East Poplar Unit Well #20
Roosevelt County, Montana

PRODUCTION DEPT.

~~FILE COPY~~

General File Copy

MURPHY CORPORATION

East Poplar Unit Well No. 20

C SW NE Section 14, Township 28N, Range 51E
Roosevelt County, Montana

Elevation 2210' RKB

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MURPHY CORPORATION

East Poplar Unit Well No. 20

LOCATION: C SW NE, Section 14, Township 28 North, Range 51 East,
Roosevelt County, Montana.

ELEVATION: 2199' Ground; 2210' RKB.

SPUDED: February 8, 1953.

COMPLETED: March 14, 1953.

TOTAL DEPTH: 5898' Driller equals 5905' Schlumberger.

HISTORY

February 8: Spudded at 4:00 P.M. Drilled 12 $\frac{1}{4}$ " hole from 0 to 73 feet.

February 9: Drilled 12 $\frac{1}{4}$ " hole from 73' to 541'.

February 10: Drilled 12 $\frac{1}{4}$ " hole from 541' to 1023'. Ran Schlumberger.

February 11: Set 31 joints, (1008.48'), 9 5/8" 36#, J-55, casing, with HOWCO float shoe landed 13' below RKB at 1013.48'. HOWCO centralizers at 979 and 913. Cemented with 400 sacks of regular Ideal cement, 15.5# slurry. Circulated approximately 30 sacks of cement to surface. Plug down at 4:31 P.M., 2-10-53. Bumped plug with 800#, held o.k.

February 12: Waiting on cement.

February 13: Tested casing with 1100# for 1/2 hour, held o.k. Found top of cement at 990'. Started drilling plug at 8:15 A.M. Drilled 8 3/4" hole from 1023 to 2273'.

February 14-
March 2: Drilled 8 3/4" hole from 2273' to 5580'. Started cutting Core No. 1 at 5580, with 7 7/8" Christensen Diamond Core Bit.

March 2: Finished cutting and pulled Core No. 1, from 5580' to 5635', recovered 55 feet.

March 3: Ran Drill Stem Test No. 1. Drilled 7 7/8" hole from 5635 to 5649'.

March 4: Drilled from 5649 to 5710. Started cutting Core No. 2 at 5710 feet.

March 5: Finished cutting and pulled Core No. 2, 5710 to 5750', recovered 40 feet. Drilled from 5750' to 5790'.

March 6: Drilled from 5790 to 5860. Pulled out of hole to start coring.

HISTORY continued:

- March 7: Cut and pulled Cora No. 3, 5860 to 5898, recovered 26 feet. Went in hole with bit to drill up core left in hole.
- March 8: Ran Schlumberger E.S. and Microlog; Schlumberger 5905'. Started running $5\frac{1}{2}$ " casing. Depth:
- March 9: Ran 189 joints, 5071.70', of $5\frac{1}{2}$ " 15.50#, J-55 German casing. Landed 12.30' below RKB. Float shoe at 5884'; float collar at 5805.60'. Centralizers at 5016, 5527, 5676, 5830, and 5870; scratchers from 5000 to 5010, 5020 to 5030, 5590 to 5600, 5611 to 5636, 5714 to 5724, 5731 to 5741, 5750 to 5770, 5863 to 5868, 5872 to 5882. Cemented with 300 sacks of Dakota regular bulk cement with 2% gel. Bumped plug with 1000#, released pressure, held o.k. Plug down at 2:00 A.M.
- March 10: Waiting on cement.
- March 11: Tested casing with 1000#, for 1/2 hours, held o.k. Drilled cement plug to 5905'; no cement in bottom 19' of hole.
- March 12: Ran Lane-Wells Gamma Ray-Neutron Log with collar log. Ran wire line junk basket. Perforated from 5720 to 5728 with 4 jet shots per foot; perforated from 5736 to 5746 with 4 jet shots per foot. Set Baker Model "D" Production Packer at 5765.7' 5945
- March 12-14: Well undergoing completion operations as set forth under "Completion Data". Rig released at 3:00 P.M., 3-14-53.

HISTORY OF OIL OR GAS WELL

16-43094-1

U. S. GOVERNMENT PRINTING OFFICE

It is of the greatest importance to have a complete history of the well. Please state in detail the dates of redrilling, together with the reasons for the work and its results. If there were any changes made in the casing, state fully, and if any casing was sidetracked or left in the well, give its size and location. If the well has been dynamited, give date, size, position, and number of shots. If plugs or bridges were put in to test for water, state kind of material used, position, and results of pumping or bailing.

Spudded at 4:00 P.M., 2-8-53. Drilled 12 1/4" hole to 1023'. Set 1000.48' of 9 5/8" casing at 1013.48'; cemented with 400 sacks of cement plug down at 4:31 P.M., 2-11-53. Drilled plug and drilled from 1023 to 4419. Depth correction: 4113 equals 4108'. Drilled from 4419 to 5283. Depth correction: 4920 equals 4918' SLM. Drilled from 5283 to 5580'. Depth correction: 5580 equals 5587' SLM. Cut and pulled Core No. 1, 5580-5635, (A Zone), recovered 55'. Ran D.S.T. No. 1, 5595 to 5605, Halliburton tool, straddle packers, 5/8" bottom choke; no water cushion. Tool open 4 hours, closed 20 minutes; opened with very weak blow, increasing to a fair blow at end of test. Gas 5000' down. Recovered: 80' clean oil, 50' mud, heavily cut with oil and gas, 30' mud, lightly cut with oil and gas, with a dark color and slight salty taste. TBHP: 32# TBHP: 125# BHSIP: 215# Hydro: 3275# Bottom packer held O.K. Drilled from 5642 to 5710. Cut and pulled Core No. 2, 5710-5750', (B-Zones), recovered 40'. Drilled from 5817 to 5860'. Strapped pipe at 5860' and corrected back to 5750 equals 5755 SLM. Cut and pulled Core No. 3 from 5860 to 5898, recovered 26'. Ran Schlumberger E.S. and Microlog, Schlumberger Depth 5905' equals 5899' Driller's depth. Ran 5871-70' of 5 1/2" casing, set at 5884; cemented with 300 sacks of cement, 2% gel. Plug down at 2:00 A.M., 3-9-53. Drilled cement plug and ran Lane-Well's Radioactivity log. Total depth: 5900' Lane-Well's. Perforated B-1 Zone from 5720-5728; perforated B-2 Zone from 5736-5746. (Lane-Well's Measurements). Set Baker Model "D" Production Packer at 5865' on wire line. Ran 191 joints, 2 3/8" tubing with 32.51 feet subs. Dual completion equipment landed 10.76 feet below R.K.B. Displaced mud with water and water with oil. Acidized B Zones with 1000 gallons Dowell, 15% regular acid. Minimum pressure 1300#; displaced 1 1/4 barrel per minute. Maximum pressure 2700#; displaced 2.30 barrels per minute. Final pressure 1700#. Flowed acid to surface in 29 minutes; started showing oil in 45 minutes. In 1 hour test B Zones, open flow, flowed 24.76 barrels fluid, 25% water. Chloride 1000,000 ppm. TFP: 0# TSIP: 250# CSIP: 300#. Flowed 12 hours in pit on 1/4" choke, averaged 58% water throughout test. TFP: 100# CSIP: 600# TSIP: 400#. Stratafraced B Zones with 1000 gallons gel acid followed with 2000 gallons Regular, 15%, Dowell acid. Maximum pressure 1950#; minimum pressure 1550#. Flowed acid back in 13 minutes. Started showing oil and water in 34 minutes. Flowed to pit for 8 hours on 3/8" choke. TFP: 100# CSIP: 600#. Averaged 50% water. Acidized C Zone, 5879 to 5900', with 1000 gallons regular, 15%, Dowell acid. Broke formation at 3000#. Displaced 3.10 barrels per minute at 2500#. Final pressure 1500#. Flowed acid to surface in 11 minutes. Started showing oil in 15 minutes. Cleaned in pit with 3/8" choke, TFP: 225# 1/4" choke, TFP: 375#. One hour test on tubing, C Zone, 10/64" choke, TFP: 700#. Flowed 16.42 barrels clean oil. TSIP: 900# CSIP: 750#. Released rig at 3:00 P.M., 3-14-53.

DRILLED 31421

EAST POPLAR UNIT NO. 20

SUPPLEMENT TO WELL HISTORY

1-24-77

Dumped 5 gallons Visco 1111 down the annulus. Mixed 200 lbs. dry acid, Visco 900, with 7 barrels water. Pumped down the casing. Mixed 10 barrels oil with Visco 4300. Pumped down the casing. Pumped a total of 35 barrels.- Stopped. Started pumping unit - pumped 10 to 15 strokes - stopped pumping unit. Pumped 92 barrels total. Shut well in overnight.

pmp gapping up - sticking

EAST POPLAR UNIT NO. 20

SUPPLEMENT TO WELL HISTORY

1-28-77

Pumped 3 barrels of Visco 957 down well. Chased with 400 barrels water, 1 gallons Visco 4300 mixed with each load. Shut well in for 24 hours.

4300 - Scale Inhibitor

EAST POPLAR UNIT NO. 20

SUPPLEMENT TO WELL HISTORY

8-20-77 Pressure well to 600 PSI - shut in. Pumped 2 barrels SP-151 chemical (Tretolite) down well and chased with 400 barrels produced water.

Shut In Overnight.

Maximum PSI 700⁺

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

East Poplar Unit K Battery and Wells EPU Nos. 20, 24, & 100

The East Poplar Unit K Battery and the wells producing into the battery, EPU Nos. 20, 24, & 100, are onshore production facilities located in Roosevelt County, Montana, in the East Poplar Unit Oil Field. The field is about 6 miles Northeast of Poplar, Montana, in Townships 28 and 29 North and Ranges 50 and 51 East.

The operator of the East Poplar Unit K Lease is Murphy Oil Corporation located at P. O. Box 547, Poplar, Montana 59255. The corporate headquarters are at 200 Jefferson Avenue, El Dorado, Arkansas, 71730.

The battery consists of a 8' x 27' vertical separator, a circulating pump with appropriate lines, and two 1,000 barrel galvanized bolted tanks. The tanks are vented to the atmosphere and have unrestricted 4" overflow lines between tanks. An earthen pit of about 12,000 barrels capacity is located at the tank battery into which the separator or tanks may be emptied if needed for fluid storage.

The EPU No. 24 is a flowing well. The EPU Nos. 20 and 100 are pumping wells. There are 4' x 4' x 2' cellars at each wellhead with overflow lines to earthen pits capable of holding a full days fluid production in case of a leak at the well site.

The field flow lines and the well casing of each well are cathodically protected. The equipment is in excellent operating condition and there is no reasonable likelihood of a discharge or spill event.

The facilities are about 3 miles from Poplar River. The terrain dips gently East. The soil is sandy and the fields are under cultivation. Because of the distance to the river, the type of soil, and the terrain the 12,000 barrel pit at the tank battery and the well cellars and overflow pits are sufficient secondary containment for these facilities.

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

East Poplar Unit K Battery and Wells EPU Nos. 20, 24, & 100

The East Poplar Unit K Battery and the wells producing into the battery, EPU 20, 24 and 100, are onshore production facilities located in Roosevelt County, Montana, in the East Poplar Unit Oil Field. The battery consists of a 8' x 27' vertical separator, a circulating pump with appropriate lines, and two 1,000 barrel galvanized bolted tanks. An earthen pit of about 12,000 barrel capacity is located at the tank battery into which the separator or tanks may be emptied if needed for fluid storage.

The field is about 6 miles Northeast of Poplar, Montana, in Townships 28 and 29 North and Ranges 50 and 51 East.

The operator of the East Poplar Unit K Lease is Murphy Oil Corporation located at P.O. Box 547, Poplar, Montana 59255. The corporation headquarters are at 200 Jefferson Avenue, El Dorado, Arkansas 71730.

The foreman, Mr. Gerald Hagadone, is responsible for oil spill prevention at this facility. On each trip to the lease the pumper makes a visual inspection of all facilities and reports any malfunction to the foreman, Mr. Gerald Hagadone, and notes this malfunction on the ten day gauge report. There has been no reportable oil Spill Event during the twelve months prior to January 10, 1974.

The equipment is in excellent operating condition and there is no reasonable likelihood of a discharge or spill event.

The field flow lines and the well casing of each well are cathodically protected.

Personnel are properly instructed in the operation and maintenance of equipment to prevent oil discharges, and applicable pollution control laws, rules and regulations. Each employee is given these instructions by the field foreman when they are employed. Scheduled prevention briefings for the operating personnel are conducted frequently enough to assure adequate understanding of the SPCC Plan. The procedures are reviewed every six months by the field foreman with each employee. When changes occur in procedures, each employee is informed.

Fluid in the 12,000 barrel storage pit is pumped to the salt water disposal unit if the water is brackish as determined by chloride tests. If only fresh water is contained in the pit it is disposed of by placing on lease roads to control dust and compact the roads. Any oil in the pit is pumped back through the separator with the water being sent to the disposal well. Oil skims are burned by state permits. There are no outlets from the storage pit and all fluids must be pumped out.

The two 1,000 barrel tanks are galvanized and are bolted construction. The tanks are vented to the atmosphere and have unrestricted 4" overflow lines between tanks.

The EPU No. 24 is a flowing well. The EPU Nos. 20 and 100 are pumping wells. There are 4' x 4' x 2' cellars at each pumping wellhead with overflow lines to earthen pits capable of holding a full days fluid production in case of a leak at the well site.

The facilities are ^{about} ~~over~~ 3 miles from the Poplar River. The terrain dips very gently East. The soil is sandy and the fields are under cultivation. Because of the distance to the river, the type of soil, and the terrain the 12,000 barrel pit at the

tank battery and the well cellars and overflow pits are sufficient secondary containment for these facilities.

The tanks are observed daily by the pumper. Periodically, the foreman checks the entire tank battery and producing wells closely. If any trouble is suspected, the facility is shut down, the tanks and/or separator are emptied and cleaned. The facility is then thoroughly inspected by service company personnel, repairs are made if needed and the unit is placed back into service.

Produced salt water is pumped to a field gathering system for injection into a salt water disposal well. The above ground facilities are observed daily by the pumper and inspected by the foreman closely on his visits to the lease.

All salt water disposal flowlines are cement asbestos lines. These lines are buried and the surface is observed daily by the pumper.

MANAGEMENT APPROVAL

This SPCC Plan will be implemented as herein described.

Signature _____

Name _____

Title _____

CERTIFICATION

I hereby certify that I have examined the facility, and being familiar with the provisions of 40 CFR, Part 112, attest that this SPCC Plan has been prepared in accordance with good engineering practices.

Printed Name Of Registered Professional Engineer

(Seal)

Signature Of Registered Professional Engineer

Date _____

Registration No. _____ State _____

Contingency Plans For An Oil Discharge

East Poplar Unit K Battery and Wells EPU Nos. 20, 24, & 100

The field is visited twice daily by the pumper. Visual inspection is made on each facility on each visit to determine if any malfunction is occurring. The most likely potential oil discharges are checked thoroughly. Periodically, the field foreman, Mr. Gerald Hagadone, will conduct a close check of the entire facility.

The pumpers, Mr. Ferdinand Charette and Mr. Robert Atkinson, have been instructed in the operations and maintenance of equipment to prevent oil and water discharges and informed of the applicable pollution control laws, rules and regulations. If an oil discharge occurs, the pumper will immediately close the proper valves and/or shut down the production facility to stop the discharge. He will then call Mr. Gerald Hagadone who will in turn inform Mr. Bill Brown, District Superintendent. If needed, the proper state and federal agencies will be notified by Mr. Brown. The discharged oil will be reclaimed or disposed of by approved engineering procedures and in accordance to law.

In the event discharged oil collects on standing water such as a stock pond or rain water standing in a low spot, the oil will be pumped into a tank truck. The skim of oil left on the water will be removed by an oil skimmer owned by Murphy Oil Corporation. The skimmer can be towed to the field within an hours time.

If the discharge is in excess of 50 barrels of oil, the Montana Department of Health and Environmental Sciences in Helena will be notified by Mr. Brown.

If a Spill Event occurs as defined by federal law, the Environmental Protection Agency in Denver, Colorado will be notified by Mr. Brown.

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images have been
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To view the actual hard copy,
contact the Region VIII Records
Center at (303) 312-6473.

Telephone numbers and personnel to be notified in case of an oil discharge are as follows:

Mr. Ferdinand Charette, Poplar, Montana

Mr. Robert Atkinson, Poplar, Montana

(406) 768-5225

Mr. Gerald Hagadone, Field Foreman, Poplar, Montana

(406) 768-3612 Office

(406) 768-3944 Home

(406) 653-1290 Mobile

Mr. W. G. Brown, District Superintendent, Poplar, Montana

(406) 768-3612 Office

(406) 768-3393 Home

(406) 653-1378 Mobile

Mr. A. W. Simpson, El Dorado, Arkansas

(501) 862-6411 Office

(501) 862-2393 Home

*Mr. Carl Hagadone, El Dorado, Ark 74555
862-6411 Office
862-1762 Home*

Montana Department Of Health and Environmental
Sciences - Helena

(406) 449-2406

(406) 245-3061 (Billings, Montana)

*Mr. Carl Hagadone, El Dorado, Ark 74555
862-6411 Office
862-1762 Home*

Environmental Protection Agency, Denver, Colorado

(303) 837-3880

(303) 837-2468

Oil Field Construction Service Company, Poplar, Montana

(406) 768-3843 Office

(406) 773-2173 Mobile

AUTHORITY FOR EXPENDITURE
MURPHY CORPORATION - EAST POPLAR UNIT NO. 20
SW NE Sec. 14, Twp. 28N., Rge. 51E., Roosevelt Co., Montana

<u>WELL DRILLING & CONSTRUCTION EXPENSE:</u>	<u>TO CSG.PT.</u>	<u>COMP. & EQUIP.</u>	<u>TOTAL COST</u>
Drilling: Footage - 5800' @ \$8/ft.	\$ 46,400	\$	\$ 46,400
Daywork - 5 days @ \$925/day		4,625	4,625
Loc. survey, permit & prep.	200		200
Roads, fences, cattleguards, etc.	250		250
Mud mat. & chem., incl. oil & gas	5,200		5,200
Fuel	5,500		5,500
Water	250		250
Drilling bits, baskets, etc.		200	200
Cementing casing	900	950	1,850
Coring materials & services	3,500		3,500
Testing services, incl. swabbing	1,800	300	2,100
Perf. services		650	650
Other logs, surveys & analyses	1,400	650	2,050
Hydrafrac, acidize, etc. incl. oil		750	750
Float equip., centralizers, etc.	125	250	375
Tubular inspection, testing, etc.		1,200	1,200
Trucking, welding & other labor	500	600	1,100
Supervision & Miscellaneous	1,800	1,200	3,000
Total est. well drlg. & const. exp.	\$ 67,825	\$ 11,375	\$ 79,200

WELL EQUIPMENT COSTS:

Casing: 1000' of 9-5/8" O.D.	3,300		3,300
Casing: 6000' of 5-1/2" O.D.		13,200	13,200
Tubing: 6000' of 2-3/8" O.D.		3,300	3,300
Packers, etc.		650	650
Casing head & connections	300		300
Xmas tree & connections		1,200	1,200
Total est. well equip. costs	\$ 3,600	\$ 18,350	\$ 21,950
Total Est. Cost of Well	\$ 71,425	\$ 29,725	\$ 101,150

LEASE EQUIPMENT:

Flow lines		800	800
Other line pipe, valves & fittings		750	750
Trucking, welding & other labor		800	800
Miscellaneous		700	700
Total est. cost of lease equip.	\$ --	\$ 3,050	\$ 3,050
TOTAL EST. COST OF WELL & LEASE EQUIP.	\$ 71,425	\$ 32,775	\$ 104,200

APPORTIONMENT OF TOTAL ESTIMATED COSTSAPPROVAL OF EXPENDITUREProduction Department

Requested by _____

Date _____

Approved by _____

Date _____

Executive Department

Approved by _____

Date _____ Pres. _____

Approved

By _____

Date _____

File #20

AUTHORITY FOR EXPENDITURE
MURPHY CORPORATION - EAST POPLAR UNIT NO. 20
SW NE Section 14, T28N, R51E, Roosevelt County, Montana

(PUMPING UNIT EXCHANGE)

1 Parkersburg Pumping Unit Complete W/86" max Stroke and 253,000" lb Peak Torque Rating Chain Reducer W/Elevated Base for Electric Motor	\$7,500
Less Trade In of 150 Used American Unit	(\$3,100)
Miscellaneous Material, Trucking and Labor	550
TOTAL ESTIMATED COST	\$4,950

PRESENT STATUS

Pumping 300 BFPD, 80 percent water from the C Zone. B-1 & 2 Zones are open and capable of producing.

JUSTIFICATION FOR EXPENDITURE

The present 160 unit is overloaded and one gear box has gone out and was replaced from spare unit.

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Corporation	31.448470%	\$1,556
Manoco Company	2.096565%	\$ 104
Placid Oil Company	33.345035%	\$1,660
Bumble Oil & Refining Company	16.335860%	\$ 809
Phillips Petroleum Company	16.335860%	\$ 809
C. F. Lundgren	.238210%	\$ 12

APPROVAL OF EXPENDITURE

Requested by: rmw 2-5-62
Field Production Superintendent Date

RECOMMEND APPROVAL:

RECOMMEND APPROVAL:

Division Production Supt. _____ Date _____

Staff Production Man _____ Date _____

RECOMMEND APPROVAL:

RECOMMEND APPROVAL:

Division Manager _____ Date _____

Budget Supervisor _____ Date _____

APPROVED:

Vice President-Operations _____ Date _____

MTJ:am
2-5-62

Received approval from Ed Bonds 2-16-62.
No Partner approval required.

File # 20

A.F.E. NO. 3-1506

AUTHORITY FOR EXPENDITURE
MURPHY CORPORATION - EAST POPLAR UNIT NO. 20
SW 1/4 NE 1/4 Section 14, T28N, R51E, Roosevelt County, Montana

(EMERGENCY)JUSTIFICATION:

AFE No. 3-1506 is to confirm the cost of Dia-logging tubing, fishing, and changing rod cut tubing that parted while attempting to release. No left latch on in Model "D" Production Packer. EPU #20 is a dual completed well in the B-1&2 Zone comingled and C-Zone with a Model "D" Packer between the B & C Zones and pumping from the C Zone only at the rate of 53 BOPD, 329 BWPD. (test date 4-9-63 after fishing job)

ESTIMATED COST

Pulling Unit 27 hours at \$30 per hour	\$ 800
1289' of 2-7/8" 6.50# 8rd. thd. EUS Tbg. Class 1 @ \$0.94 per ft.	\$1,200
Dia-Log tubing, fishing tool and back off shot	\$ 650
Misc. labor, trucking and material	\$ 150
TOTAL ESTIMATED COST	\$2,800

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Corporation	31.448470%	\$ 881
Munoco Company	2.096565%	\$ 59
Plecid Oil Company	33.545035%	\$ 939
Humble Oil & Refining Company	16.335860%	\$ 457
Phillips Petroleum Company	16.335860%	\$ 457
C.F. Lundgren	.238210%	\$ 7

APPROVAL OF EXPENDITURE

Requested By: M. T. James 4-10-63
M. T. James Date

Recommend Approval:

L. L. Duncan 4-16-63
L. L. Duncan Date

W. J. Thornton 4-17-63
W. J. Thornton Date

APPROVED:

R. J. Sweeney 4/18/63
Manager - P. & E. Date

MTJ/baw
4-10-63

FILE

made by James
A.F.E. No. 5-1521

AUTHORITY FOR EXPENDITURE

MURPHY OIL CORPORATION - EAST PORLAR UNIT NO. 20

SW NE Section 14, T23N, R51E, Roosevelt County, Oklahoma
(Fishing Tailing)

A.F.E. No. 5-1521 is to confirm the estimated cost of cutting and
releasing latch on Model "D" Production Packer to pull rod and tubing.

ESTIMATED COST

Building Unit	\$1,117.00
Fishing Tools and Wire Line Service	8,775.00
Misc. Trucking, Labor and Material	11,110.00
Total Estimated Cost	\$21,002.00

APPORTIONMENT OF TOTAL COST

Murphy Oil Corporation	31.448476%	\$6,602.12
Elcoid Oil Company	33.545035%	\$7,044.11
Humble Oil & Refining Company	16.335366%	\$3,434.11
Drilling Specialists Company	16.335366%	\$3,434.11
Huneco Company	2.096565%	\$440.41
C. J. Lundgren	.238216%	\$50.00

APPROVAL OF EXPENDITURE

Requested by:

Recommend Approval:

M. J. James
M. J. James

10-7-65 W. J. Thornton 12-13-65
Date W. J. Thornton

L. L. Hunton
L. L. Hunton

11/10/65
Date

WJH
November 7, 1965

AUTHORITY FOR EXPENDITURE
MURPHY OIL CORPORATION - EAST FOWLER UNIT NO. 20
SW NE Section 14, T28N, R51E, Roosevelt County, Montana
(Change Tubing)

PREPARE STATE: Pumping from the "C" 3 Zone, Well Test 7-15-67 259 BFPD 93% water, 18 BOPD, 251 BOPD, with tubing setting down on Model "D" Packer to isolate open B-1 and 2 Zone perforations.

Tubing Record

Date	Dialer	Hydro Test	Jcs. Added	Ft.	Est. Cost
12-08-65	Yes	Fishing Job			\$ 3,000
8-03-66	No		7	217'	\$ 527

REMARKS: When tubing last change complete tubing string. (Pay out including loss production - 2 tubing jobs.)

ESTIMATED COST

Drilling Unit, 80 hrs. at \$33.00 per hr.	\$ 660.00
4000' 2-7/8" FUM, J-55, Class No. 1 Tubing at \$0.95	\$ 3,000.00
Tuboscope Calibrated Tubing at \$2.95 ft.	\$ 400.00
Credit for Estimated 30% Class No. 2 (1200' at \$0.71 per ft.)	(\$ 850.00)
Credit for Estimated 30% Class No. 3 (1200' at \$0.47 per ft.)	(\$ 575.00)
Credit for Estimated 40% Class No. 4 (1600' at \$0.15 per ft.)	(\$ 225.00)
Misc. Labor Trucking and Material	\$ 400.00
TOTAL ESTIMATED COST	\$ 3,600.00

APPORTIONMENT OF TOTAL COST

Murphy Oil Corporation	31.442470%	\$ 1,132.00
Placid Oil Company	33.545035%	\$ 1,203.00
Humble Oil & Refining Company	16.335860%	\$ 500.00
Drilling Specialties Company	16.335860%	\$ 500.00
Murphy Company	2.095555%	\$ 75.00
C. F. Lundgren	.238210%	\$ 9.00

APPROVAL OF EXPENDITURE

Requested by:

APPROVED:

[Signature]
 Date

8-11-67
 Date

[Signature] 8-11-67
 W. J. Johnston Date

[Signature]
 Date

8/14/67
 Date

REK/cb
 August 11, 1967

AUTHORITY FOR EXPENDITURE
MURPHY OIL CORPORATION - EAST POPLAR UNIT NO. 20
SW NE Section 14, T28N, R51E, Roosevelt County, Montana
(Lay New Flowline and Change To 2-3/4" Pump)

PROPOSAL AND JUSTIFICATION: It is proposed to lay a new flowline from East Poplar Unit No. 20 to "K" battery and install a 2-3/4" bore tubing pump.

This well was originally completed with the C-Zone flowing through the tubing and the B-1 and 2 flowing up the annulus. From 1963 to 1969 the C-Zone only, was being pumped with the B-Zone shut in. The last test on the C-Zone only was 387 BFPD 19 BOPD 368 BWPD 95% BS&W with a 2" pump. Since October, 1969 the B-1 & 2 and C Zone has been pumped commingled and producing at the rate of 744 BFPD 52 BOPD 692 BWPD 93% BS&W with a 2-1/4" tubing pump. The water cut has been down as low as 91% when the pump is new. The casing is standing full at all times on this well indicating that more fluid is available. A new flowline would have to be laid to "K" battery as "H" battery will not handle the extra fluid being East Poplar Unit No. 22 and East Poplar Unit No. 55 are flowing now that East Poplar Unit No. 8-D is in operation. An increase of 40 BOPD could be expected with this installation. Payout would be 60 days using \$3.33 per bbl. as the price for the additional oil received.

ESTIMATED COST

Pulling Unit	\$ 750
2-3/4" Pump and Accessories	\$ 2,000
4000' of 2-7/8" Condition 2 Tubing	\$ 4,800
New Tubing Anchor	\$ 475
Misc. Labor, Material and Trucking	\$ 250
Total Estimated Cost	\$ 8,275

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Oil Corporation	31.148470%	\$ 2,602
Placid Oil Company	33.545035%	\$ 2,776
Exxon Company, U.S.A.	16.335840%	\$ 1,352
Phillips Petroleum Company	16.225860%	\$ 1,352
Nunco Company	2.049565%	\$ 173
C. F. Lundgren	.238210%	\$ 20

APPROVAL OF EXPENDITURE

Requested by:

Approved by:

 W. C. Brown

Date

 A. W. Simpson

Date

WGB:sh
 February 6, 1971

AUTHORITY FOR EXPENDITURE
MURPHY OIL CORPORATION - EAST POPLAR UNIT NO. 20
SW NE Section 14, T28N, R51E, Roosevelt County, Montana
(Lay New Flowline and Change To 2-3/4" Pump)

PROPOSAL AND JUSTIFICATION: It is proposed to lay a new flowline from East Poplar Unit No. 20 to "K" battery and install a 2-3/4" bore tubing pump.

This well was originally completed with the C-Zone flowing through the tubing and the B-1 and 2 flowing up the annulus. From 1963 to 1969 the C-Zone only, was being pumped with the B-Zone shut in. The last test on the C-Zone only was 387 BFPD 19 BOPD 368 BWPD 95% BS&W with a 2" pump. Since October, 1969 the B-1 & 2 and C Zone has been pumped commingled and producing at the rate of 744 BFPD 52 BOPD 692 BWPD 93% BS&W with a 2-1/4" tubing pump. The water cut has been down as low as 91% when the pump is new. The casing is standing full at all times on this well indicating that more fluid is available. A new flowline would have to be laid to "K" battery as "H" battery will not handle the extra fluid being East Poplar Unit No. 22 and East Poplar Unit No. 55 are flowing now that East Poplar Unit No. 8-D is in operation. An increase of 40 BOPD could be expected with this installation. Payout would be 60 days using \$3.33 per bbl. as the price for the additional oil received.

ESTIMATED COST

Pulling Unit	\$ 750
2-3/4" Pump and Accessories	2,000
4000' of 2-7/8" Condition 2 Tubing	4,800
New Tubing Anchor	475
Misc. Labor, Material and Trucking	250
Total Estimated Cost	\$ 8,275

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Oil Corporation	31.448470%	\$ 2,602
Placid Oil Company	33.545035%	2,776
Exxon Company, U.S.A.	16.335860%	1,352
Phillips Petroleum Company	16.335860%	1,352
Munoco Company	2.096565%	173
C. F. Lundgren	.238210%	20

APPROVAL OF EXPENDITURE

Requested by:

Approved by:

W. G. Brown
W. G. Brown

2-6-73 A. W. Simpson
Date A. W. Simpson

2/21/73
Date

WGB/sb
February 6, 1973

Date Job Completed 4-11-73
Approximate Cost \$ 7,841
By Gerald Hagadone

This job went a little better than planned as can be seen by the cost. The production did not quite meet expectations but was very close. Test indicate ~~387~~ BFPD ~~19~~ BOPD ~~368~~ BWPD
91% BS&W 911 82 829

M. T. James

File # 20

A.F.E. No. 9-1522 -10

AUTHORITY FOR EXPENDITURE
MURPHY OIL CORPORATION - EAST POPLAR UNIT NO. 20
SW NE Section 14, T28N, R51E, ROOSEVELT COUNTY, MONTANA
CHANGE TUBING

JUSTIFICATION:

A.F.E. No. 9-1522 is to confirm the estimated expense of Hydro-testing part of the old tubing string and finding 95% bad and changing to new tubing. Raising pump depth to 3000' and pumping commingled with the B-1, 2 & C Zones.

Results of Commingling C Zone and B-1 and 2 Zone: 29 BOPD increase at \$1.50 per barrel, net = \$43 per day - Payout 80 days.

ESTIMATED COSTS

Pulling Unit Cost, 29 hrs. at \$36/hr.	\$ 1,044
3000', 2 7/8" Tubing, Class No. 1 & 2	2,732
Hydro Test and Tuboscope old tubing	762
Credit for old salvaged tubing (1803', 2 3/8" Class No. 2)	(1,972)
Miscellaneous Trucking, Labor and Material	896
TOTAL ESTIMATED COSTS	\$ 3,456

APPORTIONMENT OF TOTAL ESTIMATED COSTS

Murphy Oil Corporation	31.448470%	\$ 1,087
Placid Oil Company	33.545035%	1,159
Humble Oil & Refining Company	16.335860%	565
Phillips Petroleum Company	16.335860%	565
Munoco Company	2.096565%	72
C. F. Lundgren	.238210%	8

APPROVAL OF EXPENDITURE

Requested By:

APPROVED:

M. T. James

10-20-69

W. J. Thornton

10-28-69
Date

MTJ/sb/bka
10-27-69

AUTHORITY FOR EXPENDITURE
MURPHY OIL CORPORATION - EAST POPLAR UNIT NO. 20
SW NE Section 14, T28N, R51E, Roosevelt County, Montana
(Change Flowline)

PROPOSAL AND JUSTIFICATION: It is proposed to change the 3" CIBA fiberglass line to 2-7/8" tuboscoped tubing.

A 3" CIBA fiberglass flowline was installed in April 11, 1973 and after a number of leaks it was proven to be faulty pipe and CIBA refunded the purchase price of the pipe and fittings that were ordered on P.O. 61650. In the past two weeks we have experienced 5 more flowline leaks which we have repaired. This line is approximately 3800' in length and we have about 3200' of tuboscoped Cond. 3 2-7/8" tubing on hand which would reach East Poplar Unit No. 100. East Poplar Unit No. 20 would then go into No. 100's 3" steel line and No. 100 would go into the good section of 3" fiberglass line. East Poplar Unit No. 20 is a candidate for a submersible pump and a new fiberglass line would not tolerate the increase in flowline temperature.

ESTIMATED COST

3200' of Condition 3 Tubing at .43/ft.	\$ 1,375
Ditching, Laying and Backfilling	\$ 1,900
Misc. Labor, Material and Trucking	\$ 500
Total Estimated Cost	\$ 3,775

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Oil Corporation	31.448470%	\$ 1,187
Placid Oil Company	33.545035%	\$ 1,266
Exxon Company, U.S.A.	16.335860%	\$ 617
Phillips Petroleum Company	16.335860%	\$ 617
Munoco Company	2.096565%	\$ 79
C. F. Lundgren	.238210%	\$ 9

APPROVAL OF EXPENDITURE

Requested by:

Approved by:

<u>W. G. Brown</u>	<u>2-22-74</u>	<u>A. W. Simpson</u>	<u>3/4/74</u>
W. G. Brown	Date	A. W. Simpson	Date

Date Job Completed 3/10/74
 Approximate Cost 2955
 By Gerald Hargadone

This job went as planned. We were under the AFE'd cost because we were able to get by with 2800' of pipe and ditching. The 2955 includes repairing a leak in the 2 7/8" lbg caused by a rod cut joint that was not found by tuboscope.

REC. PROD. OCT 24 1976

A.F.E. No. 6-1533-10-S1

AUTHORITY FOR EXPENDITURE
MURPHY OIL CORPORATION - EAST POPLAR UNIT NO. 20
SW NE Section 14, T28N, R51E, Roosevelt County, Montana

This A.F.E. was overspent due in part because of extra rig time involved in running smaller tubing pump while waiting on adapter connections for the 3-3/4" tubing pump. Also, more roustabout time was required than anticipated. The cost of repairing the smaller tubing pump and anchor plus having to buy a new On-Off tool for sucker rods was not included on A.F.E..

ESTIMATED COST

	A.F.E. Cost	Actual Cost	Supplement No. 1
640 Lufkin Pumping Unit, Cond. 2			
75 H.P. Electric Motor, Cond. 2	\$ 1,555	\$ 1,752	\$ 197
3-3/4" Pump	\$ 4,300	\$ 5,590	\$ 1,290
Pumping Unit Foundation	\$ 680	\$ 807	\$ 127
Workover Rig	\$ 810	\$ 2,727	\$ 1,917
Roustabout Labor	\$ 840	\$ 1,750	\$ 910
Trucking	\$ 450	\$ 567	\$ 117
Misc. Material, Supervision, Etc.	\$ 100	\$ 1,522	\$ 1,422
Total Estimated Cost	\$ 8,735	\$14,715	\$ 5,980

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Oil Corporation	31.448470%	\$ 2,747	\$ 4,628	\$ 1,881
Placid Oil Company	33.545035%	\$ 2,930	\$ 4,936	\$ 2,006
Phillips Petroleum Company	16.335860%	\$ 1,427	\$ 2,404	\$ 977
Exxon Company, U.S.A.	16.335860%	\$ 1,427	\$ 2,404	\$ 977
Munoco Company	2.096565%	\$ 183	\$ 308	\$ 125
C. F. Lundgren	.238210%	\$ 21	\$ 35	\$ 14

APPROVAL OF EXPENDITURE

Requested by:

Approved by:

Billy G. Melear
 Billy G. Melear

10-21-76
 Date

A. W. Simpson 10/25/76
 A. W. Simpson Date

BGM/sb
 October 21, 1976

REC. PROB. JAN 17 1977

A.P.E. No. 7-1500-10

MURPHY OIL CORPORATION
AUTHORITY FOR EXPENDITURE - EAST POPLAR UNIT NO. 20
SW NE Section 14, T28N, R51E, Roosevelt County, Montana

It is proposed to squeeze this well with 2 drums of Visco 957 Scale Inhibitor by shutting the well in and pumping the inhibitor down the casing followed with 150 barrels of produced water and leaving shut in for 24 hours.

The well is now being treated daily down the casing, but the pump continues to stick and has to have acid circulated to free the pump. Visco believes this treatment will be good for at least 90 days.

ESTIMATED COST

2 Drums of Visco 957 Chemical	\$ 725
Pump Truck	\$ 72
TOTAL ESTIMATED COST	\$ 797

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Oil Corporation	31.448470%	\$ 251
Placid Oil Company	33.545035%	\$ 267
Phillips Petroleum Company	16.335860%	\$ 130
Exxon Company, U.S.A.	16.335860%	\$ 130
Munoco Company	2.096565%	\$ 17
C. F. Lundgren	.238210%	\$ 2

APPROVAL OF EXPENDITURE

Requested by:

Approved by:

Billy D. Melear
Billy D. Melear

1-13-77
Date

A. G. Simpson
A. G. Simpson

1-17-77
Date

E'PU #20

Rec. Pr

APR 4 1988

A.F.E. NO. 8-0507-010

MURPHY OIL USA, INC.
AUTHORITY FOR EXPENDITURE
EAST POPLAR UNIT NO. 20
SW NE SECTION 14, T28N, R51E
ROOSEVELT COUNTY, MONTANA

PROPOSAL & JUSTIFICATION:

This well is being pumped with a 456 Lufkin unit and the gear box has failed. It is proposed to rebuild this gear box with new gears and bearings. This well makes 37 barrels oil per day, at this rate it should pay out in 47 days.

ESTIMATED COST

Bearings & Gears -----	\$ 8,100
Labor & Trucking -----	3,000
Supervision & Miscellaneous -----	900
Total Estimated Cost	\$12,000

APPORTIONMENT OF TOTAL COST

Murphy Oil USA, Inc.	81.329265%	\$ 9,760
Exxon Company, U.S.A.	16.335886%	1,960
Munoco Company	2.096565%	251
C. F. Lundgren	.238210%	29

APPROVAL OF EXPENDITURE

Requested by:

Approved by:

Raymond Reede 3/31/88
Raymond Reede Date

A. W. Simpson 4/4/88
A. W. Simpson Date

RR/jh
March 31, 1988

DATE JOB COMPLETED 4-30-88
APPROXIMATE COST \$13,489.00
BY RR

PERMIT
APPLICATIONS

(SUBMIT IN TRIPLICATE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Indian Agency _____

Fort. Peck _____

Allottee James Seeds _____

Lease No. 1-37-ind-12968

SUNDRY NOTICES AND REPORTS ON WELLS

NOTICE OF INTENTION TO DRILL	SUBSEQUENT REPORT OF WATER SHUT-OFF	RECEIVED MAR 20 1953 U. S. GEOLOGICAL SURVEY BILLINGS, MONTANA XXX
NOTICE OF INTENTION TO CHANGE PLANS	SUBSEQUENT REPORT OF SHOOTING OR ACIDIZING	
NOTICE OF INTENTION TO TEST WATER SHUT-OFF	SUBSEQUENT REPORT OF ALTERING CASING	
NOTICE OF INTENTION TO REDRILL OR REPAIR WELL	SUBSEQUENT REPORT OF REDRILLING OR REPAIR	
NOTICE OF INTENTION TO SHOOT OR ACIDIZE	SUBSEQUENT REPORT OF ABANDONMENT	
NOTICE OF INTENTION TO PULL OR ALTER CASING	SUPPLEMENTARY WELL HISTORY	
NOTICE OF INTENTION TO ABANDON WELL		

(INDICATE ABOVE BY CHECK MARK NATURE OF REPORT, NOTICE, OR OTHER DATA)

March 17, 1953

Well No. 20 is located 1980 ft. from N line and 1980 ft. from E line of sec. 14

SW 1/4 NE 1/4 Sec. 14	28N	51E	
(4 Sec. and Sec. No.)	(Twp.)	(Range)	(Meridian)
East Poplar	Roosevelt	Montana	
(Field)	(County or Subdivision)	(State or Territory)	

The elevation of the ~~ground~~ ^{ground} above sea level is 2199 ft.

DETAILS OF WORK

(State names of and expected depths to objective sands; show sizes, weights, and lengths of proposed casings; indicate gridding jobs, cementing points, and all other important proposed work)

5900 feet. Acidized C Zone, 5879 to 5900', with 1000 gallons regular, 15% Dowe acid. Broke formation at 3000#. Displaced 3.10 barrels per minute at 2500#. Final pressure 1500#. Flowed acid to surface in 11 minutes. Started showing oil in 15 minutes. Cleaned into pit with 3/8 inch choke. TFP: 225#. 1/4 inch choke, TFP: 375#. 1 hour test on tubing, C Zone, 10/64 inch choke, TFP: 700#. Flowed 16.42 barrels clean oil. TSIP: 900# CSIP: 750#. Shut in 2:45 P.M., 3-14-53. Waiting on storage. Released rig at 3:00 P.M., 3-14-53.

Approved *H. S. Smith*

MAR 20 1953

District Engineer

I understand that this plan of work must receive approval in writing by the Geological Survey before operations may be commenced.

Company Murphy Corporation

Address Box 76

Poplar, Montana

By *Harold Q. Smith*

Title District Production Supt.

GEOLOGICAL DATA

Form 9-330

51E

RECEIVED

MAR 25 1953

U. S. GEOLOGICAL SURVEY

UNITED STATES

DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

RECEIVED

MAR 23 1953

U. S. GEOLOGICAL SURVEY

BILLINGS, MONTANA

LOG OF OIL OR GAS WELL

LOCATE WELL CORRECTLY

Company Murphy Corporation Address Box 76, Poplar, Montana
 Lessor or Tract East Poplar Unit Field East Poplar State Montana
 Well No. 20 Sec. 14 T. 28N R. 51E Meridian Principal County Roosevelt
 Location 1980 ft. [N.] of N. Line and 1980 ft. [E.] of E. Line of Sec. 14 Elevation 2210 D.F.
 (Denote floor relative to sea level)

The information given herewith is a complete and correct record of the well and all work done thereon so far as can be determined from all available records.

Signed

*Harold Milne*Date March 18, 1953 Title District Production Supt.

The summary on this page is for the condition of the well at above date.

Commenced drilling February 8, 1953 Finished drilling March 14, 1953

OIL OR GAS SANDS OR ZONES

(Denote gas by G)

No. 1, from A 5602 to 5612 No. 4, from C 5882 to 5892No. 2, from B-1 5726 to 5732 No. 5, from 5732 to 5741No. 3, from B-2 5741 to 5751 No. 6, from 5751 to 5761

IMPORTANT WATER SANDS

No. 1, from 5761 to 5771 No. 3, from 5771 to 5781No. 2, from 5781 to 5791 No. 4, from 5791 to 5801

CASING RECORD

Size casing	Weight per foot	Threads per inch	Make	Amount	Kind of shoe	Cut and pulled from	Perforated		Purpose
							From	To	
9 5/8"	36#	8	Nat'l.	1000.48	HOWCO				Surface
5 1/2"	15.5#	8	German	5871.70	Larkin		5720	5728	Oil String
							5736	5746	

MUDDING AND CEMENTING RECORD

Size casing	Where set	Number sacks of cement	Method used	Mud gravity	Amount of mud used
9 5/8"	1013.48	400	Pump & Plug		
5 1/2"	5884.00	300	Pump & Plug		

MARK

PLUGS AND ADAPTERS

Heaving plug—Material Length Depth set

Adapters—Material Size

SHOOTING RECORD

Size	Shell used	Explosive used	Quantity	Date	Depth shot	Depth cleaned out

TOOLS USED

Rotary tools were used from 0 feet to 5900 feet, and from feet to feet

Cable tools were used from feet to feet, and from feet to feet

DATES

....., 19..... Put to producing March 14....., 1953.

The production for the first ²~~24~~ hours was 41.18 barrels of fluid of which 75 % was oil; 25 % emulsion; % water; and % sediment. Gravity, °Bé.

If gas well, cu. ft. per 24 hours Gallons gasoline per 1,000 cu. ft. of gas

Rock pressure, lbs. per sq. in.

EMPLOYEES

..... Jack Gore....., Driller E. P. Thompson....., Driller

..... Dan McAnally....., Driller , Driller

FORMATION RECORD

FROM—	TO—	TOTAL FEET	FORMATION
FORMATION TOPS			
Judith River	835		Rierdon 3992
Eagle	1228		Piper Shale 4350
Niobrara	2090		Piper ls. 4428
Greenhorn	2434		Gypsum Springs 4483
Graneros	2647		Spearfish 4677
U. Muddy	2788		Amsden 4810
Muddy	3007		Otter 5080
Skull Creek	3053		Kibbey 5240
Dakota Silt	3223		Kibbey ls. 5390
Morrison	3600		Madison 5493
Swift	3660		

(OVER)

10-43004-2

Location: C SW NE Sec. 14, T28N-R51E

Spacing = 160 acres

Elevation: 2199' Gr. - 2210' K.B.

SpudGed: 2-8-53

Completed: 3-14-53

T.D.: 5898' Driller = 5905' Schl.

Prod. Zones: B-1 (5720-28') B-2 (5736-46')

C-2 Open hole (5881-90')

Schlumberger Tops

	Depth	Datum	Thickness
Judith River	835	+1375	
Greenhorn	2454	- 224	
Muddy Sd	3007	- 797	
Dakota Silt	3223	-1013	
Piper Ls	4428	-2218	
Amsden	4784	-2574	
Heath	4938	-2728	
Otter	5080	-2870	
Kibbey Sd	5240	-3030	
Kibbey Ls	5390	-3180	
Madison	5493	-3283	
A-1	**5563	-3373	3'
A-2	**5590	-3380	4'
A-3	**5604	-3394	16'
A-4	**5620	-3410	22'
B-1	5724	-3514	8'
B-2	5741	-3531	15'
B-3	**5764	-3554	5'
B-4	**5795	-3585	5'
B-5	5832	-3622	?
C-1	**5866	-3656	?
C-2	5882	-3672	13'

**Probable prod. Zones (From DST structural position, etc.)

*Shows

Drill Pipe Corrections (Made)

4113 Driller = 4108 SLM (-5')

4920 Driller = 4918 SLM (-2')

5761 Driller = 5767 SLM (+6')

Coring Intervals:

#1 5580-5635 Rec. 55' A-2, 34'

#2 5710-5750 Rec. 40' B-1 & 2

#3 5860-5898 Rec. 26' C-1 & 2

Drill Stem Tests:

DST #1 5596-5605' A-3 & 4, Op 4 hrs, SI 20 min.

Rec. 80' clean oil, 50' mud, heavily cut w/oil & gas, 30' mud, lightly cut with oil & gas, dark color sl salty taste. IBHFP 32#, EBHFP 125#, BHSIP 215#, Hydro 3275#.

History Subsequent to Completion:

None

DRILLING BIT AND TOTCO RECORD

<u>Make</u>	<u>Size</u>	<u>Run No.</u>	<u>Type Cone</u>	<u>Ser. No.</u>	<u>From</u>	<u>To</u>	<u>Footage</u>	<u>Totco Footage</u>	<u>Degrees</u>
Hughes	8 3/4	1	OSC-3J	48840	1020	2469	1449	230	3/4°
"	"	2	OSC-1J	18930	2469	3123	654	738	3/4°
"	"	3	OSC-J	18907	3123	3395	272	1023	3/4°
"	"	4	OSC-J	18908	3395	3620	225	2469	1/2°
"	"	5	OWV-J	25099	3620	3777	157	3123	1°
"	"	6	OWV-J	25082	3777	4113	336	3390	1°
"	"	7	OWV-J	25077	4113	4419	306	4113	1°
"	"	8	OWV-J	25076	4419	4628	209	4440	1 1/2°
"	"	9	OWV-J	25084	4628	4739	111	4628	3/4°
"	"	10	OWV-J	25430	4739	4916	179		
"	"	11	OWV	68755	4916	5028	112	5028	1/2°
"	"	12	W7	55650	5028	5116	88		
"	"	13	OWV	68436	5116	5246	130		
"	"	14	OWV-J	25083	5246	5306	60	5300	3/4°
"	"	15	OWC-J	25716	5306	5414	106	5408	3/4°
"	"	16	OWV-J	25087	5414	5580	166		
"	7 7/8	17	OVS	86630	5642	5710	68		
"	"	18	OVS	82990	5750	5817	67		
"	"	19	OVS	75319	5817	5860	43		

DIAMOND CORE BIT RECORD

<u>Core No.</u>	<u>Make</u>	<u>Size</u>	<u>Ser. No.</u>	<u>From</u>	<u>To</u>	<u>Footage</u>
Core #1	Christensen	7 7/8	J-1846	5580	5635	55'
Core #2	Christensen	7 7/8	J-1846	5710	5750	40'
Core #3	Christensen	7 7/8	J-1846	5860	5898	38'
Total Footage:						133'

ELECTRO LOG DATA

TYPE OF LOGINTERVAL LOGGED

Schlumberger Electric Logs:

2" Electrical Survey	15'-5904'
5" Electrical Survey	2490'-5904'
5" Microlog	2490'-5902'
25" Microlog	3400'-5902'

Lane-Wells Radioactivity Logs:

Gamma-Ray	4900'-5888'
Neutron	4900'-5898'

LOG TOPS

	<u>Depth</u>	<u>Datum</u>	<u>Thickness</u>
Judith River	835	+1375	
Eagle	1228	+ 982	
Niobrara	2090	+ 120	
Greenhorn	2434	- 224	
Graneros	2647	- 437	
U. Muddy	2788	- 578	
Muddy	3007	- 797	
Skull Crk.	3053	- 843	
Dakota Silt	3223	-1013	
Morrison	3600	-1390	
Swift	3660	-1450	
Rierdon	3992	-1782	
Piper Sh	4350	-2140	
Piper Ls.	4428	-2218	
Gypsum Sprgs	4483	-2273	
Spearfish	4677	-2467	
Amsden	4784	-2574	
Heath	4938	-2728	
Otter	5080	-2870	
Kibbey Sd.	5240	-3030	
Kibbey Ls.	5390	-3180	
Madison	5493	-3283	
A-1	5583	-3373	3'
A-2	5590	-3380	4'
A-3	5604	-3394	16'
A-4	5620	-3410	22'
B-1	5724	-3514	8'
B-2	5741	-3531	15'
B-3	5764	-3554	5'
B-4	5795	-3585	5'
B-5	5832	-3622	?
C-1	5866	-3656	?
C-2	5882	-3672	13'

===== C O R E D E S C R I P T I O N S =====

Core No. 1

5580-5635

Rec. 55'

C. T. 55, 33, 17, 30, 30/ 25, 30, 42, 23, 25/ 23, 14, 40, 66, 38/ 27, 32,
 27, 33, 31/ 26, 26, 25, 26, 27/ 21, 24, 25, 34, 30/ 20, 21, 17, 15,
 25/ 27, 27, 26, 26, 26/ 25, 25, 24, 28, 22/ 25, 21, 20, 20, 30/ 38,
 29, 31, 33, 37/

5' Anhydrite, dark gray, medium soft, fine crystalline, dense with num-
 erous thin streaks of brown, fine crystalline, dense dolomite. No Show.

2' Dolomite, dark brown, microcrystalline, very hard, dense; occasional
 thin stringer of light gray, fine crystalline anhydrite. No Show.

5'6" Anhydrite, light gray to pink, fine crystalline, medium soft, dense.
 No Show.

9 1/2' ** 4' Limestone, brownish-gray, amorphous, hard, good fracture porosity;
 9 1/2' numerous very short, well developed, irregular fractures; good oil
 odor and bright, even, golden-yellow fluorescence along fracture
 planes; occasional black stylolite.

9'6" Limestone, brownish-gray, amorphous, very hard, dense; occasional
 very tight, irregular hairline fracture, cemented with selenite;
 numerous black stylolites. No Show.

* 9' Limestone, brownish-gray, fine to medium crystalline, medium soft,
 good intercrystalline porosity and permeability; occasional very
 thin, tight, vertical hairline fracture, cemented with selenite;
 faint water odor on fresh break, even bright, milky-white fluores-
 5 1/5 cence; entire unit looks wet. No Show.

*10'6" Limestone, dark gray, oolitic, medium soft, well developed oolites,
 good porosity and permeability, slightly fossiliferous; faint gas
 odor on fresh break; even, bright milky-white fluorescence; slight
 oil stain; unit looks wet.

5' Anhydrite, light gray, fine crystalline, medium soft; numerous paper-
 thin black calcite shale partings, dense. No Show.

4'6" Dolomite, light gray, microcrystalline, very hard, dense; numerous
 very thin, tight, hairline fractures, well cemented with selenite.
 No Show.

Note: **-Top 5 feet of fractured "A" Zone analyzed by Special Analysis.
 * -Bottom 21 feet of "A" Zone analyzed by Conventional Analysis.
 (Chemical & Geological Laboratories)

CORE DESCRIPTIONS

5710-5750

Core No. 2

Rec. 40'

C. T. 40, 25, 25, 25, 21/ 24, 24, 17, 19, 10/ 15, 19, 15, 8, 7/ 7, 8, 9, 19, 17/ 18, 11, 15, 15, 14/ 16, 20, 19, 22, 20/ 24, 23, 18, 17, 19/ 22, 21, 15, 17, 17/

2' Anhydrite, light gray, fine crystalline, medium hard; numerous vugs caused by solution of salt; occasional thin stringer of salt partially dissolved. No Show.

6' Anhydrite, light gray, fine crystalline, medium hard; numerous paper-thin, black, calcareous shale partings; dense. No Show.

5718
* 2'6" 5720 1/2" Limestone, brownish-gray, oolitic to pseudo-oolitic, medium hard, numerous 1/16" oolites in a brownish-gray, earthy matrix, fair porosity and permeability; good oil odor and taste; good, even, dull, golden-yellow fluorescence; numerous small brown calcite crystals.

5722 1/2" * 2' Limestone, dark gray, amorphous to microcrystalline, very hard, dense, except for numerous very short, fairly tight, irregular fractures, cemented with numerous small calcite crystals; good porosity and permeability along fracture planes; good oil odor and taste; good, even, dull golden-yellow fluorescence along fracture planes.

5726 * 3'6" Limestone, dark brownish-gray, fine to medium crystalline, medium soft, good intercrystalline porosity and permeability, with some good vuggy porosity and free oil bleeding from vugs; numerous small crystals of clear calcite; good oil odor and taste; good, even, dull golden-yellow fluorescence; occasional 1/2" streak of fractured, dense, amorphous limestone near base of unit.

5735 9' Anhydrite, light gray, fine crystalline, medium soft, dense; numerous irregular, paper-thin streaks of dark gray calcareous shale. No Show.

* 3' Limestone, medium brownish-gray, earthy, medium soft; numerous fairly large, 1/4" crystals of clear calcite, fair intercrystalline porosity and permeability with an occasional small pin-point vug bleeding free oil; good oil odor and taste; good, even, dull yellow fluorescence.

5750 * 12' Limestone, dark brownish-gray, very fine crystalline, hard, very slightly porous, with numerous thin (1") dense streaks; occasional very tight, hairline fracture cemented with calcite; numerous black stylolites; good oil odor on fresh break; uneven, dull, golden-yellow fluorescence.

Note: * - Conventional Analysis; and analyzed by Chemical & Geological Lab.

Core No. 3

5860-5898

Rec. 26'

C. T. 25, 18, 23, 26, 26/ 30, 22, 18, 19, 15/ 16, 14, 14, 17, 15/ 15, 14, 13, 14, 12/ 5, 3, 9, 6, 8/ 7, 5, 5, 5, 36, 28, 20, 18, 21, 27/ 27, 24, 35

1' Limestone, light to medium gray, fine crystalline, medium hard, dense. No Show.

CORE DESCRIPTIONS

Core No. 3 continued:

5860-5898 Rec. 26'

- 1' Limestone, light gray, very fine crystalline, very hard, very dolomitic, occasional short, very tight, hairline fracture cemented with calcite, dense. No Show.
- 2' Limestone, dark gray to black, very argillaceous, medium hard, breaks along thin shale partings, slightly pyritic, dense. No Show.
- 1' Dolomite, dark brownish-gray, microcrystalline, very hard, dense, except for occasional very thin, wavy streak having fair porosity. Porous streaks look wet. No Show.
- 1'6" Limestone, brownish-gray, microcrystalline, medium hard, dense; occasional black stylolite. No Show.
- 6" Dolomite, light gray, fine crystalline, very hard, dense, except for single very thin porous streak that looks wet. No Show.
- 7' Limestone, dark brownish-gray, very fine to microcrystalline, very hard, dense, except for occasional long, tight, vertical fracture cemented with selenite; single 3 inch porous streak toward middle of unit with good oil odor and even golden-yellow fluorescence, otherwise, no show.
- 3'6" Limestone, brownish-gray, very fine crystalline, medium hard, very slightly porous, questionably permeable; several long, tight, vertical fractures cemented with selenite. No Show.
- 1'6" Limestone, brownish-gray, fine crystalline, very hard; dense, single tight, hairline fracture running length of unit. No Show.
- * 4'6" Limestone, dark brownish-gray to black, very fine crystalline, medium soft, very slightly porous, questionable permeable; occasional well-developed vertical fracture cemented with selenite; good oil odor and stain; good even, dull, golden fluorescence; entire unit is very tight.
- 2'6" Limestone, brownish-gray, fine crystalline, medium hard, dense; numerous black stylolites. No Show.

Note: * = Conventional Method; analyzed by Chemical & Geological Lab.

D R I L L S T E M T E S T S

DST #1, 5596 to 5605, Halliburton Tool, straddle packers, 5/8" bottom chokes; no water cushion. Tool open 4 hours, closed 20 minutes; opened with very weak blow, increasing to a fair blow at end of test. Gas pressures: 5000' down; recovered: 80' clean oil, IBHFP: 32# 50' mud, heavily cut with oil & gas, FBHFP: 125# 30' mud, lightly cut with oil & gas, BHSIP: 215# dark color & slight salty taste. HYDRO: 3275#

CORE ANALYSIS REPORTS

Company MURPHY CORPORATION Date March 8, 1953 Lab. No. 25
 Well No. East Poplar Unit #20 Location C SW NE 14-28N-51E
 Field East Poplar Formation "A" "B-1" "B-2" C
 County Roosevelt Depths 5613 - 5886
 State Montana Drilling Fluid Mud

LEGEND

C--Crack	NF--No Fracture	S--Slight
F--Fracture	IS--Insufficient Sample	St--Stain
H--Horizontal		V--Vertical
O--Open		Vu--Vugs

Sample No.	Legend	Depth	Effective Porosity % PoreSpace	Permeability Millidarcies		Saturations	
				Horizontal	Vertical	%PoreSpace Resid. Oil	Total Water
Zone, "A"							
6	C,I,St	5613-14	14.8	44		Tr.	17.3
7	C,Sty,St	14-15	13.8	277		0.0	12.8
8	C,I,St	15-16	7.6	2.3		10.2	89.2
9	C,I,St	16-17	12.4	61		6.7	53.1
10	C,I,St	17-18	15.7	52		1.9	24.5
11	C,I,St	18-19	16.7	158		6.9	30.7
12	C,I,St	19-20	6.3	2.3		8.7	72.3
13	Sty,I,St	20-21	8.2	21		7.3	86.9
14	C,I,St	21-22	6.6	38		14.1	73.6
15	C,I,St	22-23	12.8	0.58		6.6	69.6
16	C,Shy,I,St	23-24	3.6	0.05		Tr.	93.3
17	C,I,St	24-25	1.7	0.01		26.0	69.6
18	I,St	25-26	13.4	5.9		15.1	40.7
19	I,Shy,St	26-27	3.0	3.7		14.7	67.3
20	C,I,St	27-28	5.1	0.14		22.5	75.1
21	I,St	28-29	7.5	0.05		19.9	77.2
22	I,St	29-30	14.5	77		18.4	57.7
23	I,St	30-31	10.0	3.1		2.7	47.2
24	C,I,St	31-32	24.0	56		4.9	23.1
25	C,I,St	32-33	7.4	21		9.2	30.9
26	C,I,Any	33-34	0.4	12		0.0	20.0
Zone, "B-1"							
27	VF,St,I	5718-19	8.6	0.21		11.6	31.4
28	St,I	19-20	17.5	5.8		18.9	26.3
29	VF,St,I	20-21	9.6	0.38		17.7	29.2
30	C,St	21-22	4.6	0.72		1.9	76.1
31	VC,St	22-23	6.1	0.58		7.9	65.6
32	S,Vu,St,I	23-24	15.1	13		15.9	14.6
33	HC,St,I	24-25	12.3	7.5		26.0	26.8
34	VC,St,I	25-26	8.0	3.1		17.5	40.0
Zone, "B-2"							
35	S,Vu,St	5735-36	16.7	2.7		11.4	16.8
36	St,I	36-37	17.2	14		13.4	34.3
37	VF,St,I	37-38	11.6	2.9		23.3	31.0
38	VC,St,I	38-39	14.2	8.2		20.4	38.7
39	C,St	39-40	3.0	0.09		16.3	66.7
40	St,I	40-41	9.9	1.3		9.6	19.2

CORE ANALYSIS REPORTS

Sample No.	Legend	Depth	Effective Porosity % PoreSpace	Permeability Millidarcies		Saturation % Pore Space	
				Horizontal	Vertical	Resid.Oil	Total Water
41	Sty,St	5741-42	2.2	I.S.		13.6	81.8
42	St,I	42-43	8.0	1.1		13.8	27.5
43	St,I	43-44	12.8	3.2		8.6	10.9
44	St	44-45	10.4	1.1		21.2	21.2
45	St	45-46	12.9	4.9		13.2	31.8
46	S,Vu,St	46-47	6.1	1.2		23.0	18.0
47	St	47-48	16.8	9.1		13.7	25.6
48	St	48-49	9.5	3.3		6.1	21.1
49	VF,St	49-50	1.8	0.62		20.6	30.0
		Zone, "C"					
50	C,I,St	5879-80	2.4	-0.01		4.2	70.8
51	C,I,St	80-81	11.8	0.18		18.6	18.6
52	C,I,St	81-82	15.3	0.31		29.4	20.9
53	C,I,St	82-83	14.5	0.07		34.5	28.3
54	C,I,St	83-84	15.3	0.21		26.1	29.4
55	I,St	84-85	2.0	0.01		Tr.	45.0
-	-	85-86?	-	-		-	-

CORE ANALYSIS REPORT

FULL DIAMETER CORE STUDY

Sample No.	Representative of Feet	Footage	Permeability		Effective Porosity Per Cent	Density		Saturation Pore Space Residual	
			Radial	Vertical		Bulk	Matrix	Oil	Water
1	5599-5600	1.0	3.6	0.08	1.2	2.69	2.73	Tr.	65.8
2	5600-5601	1.0	13	3.9	3.8	2.61	2.71	0	22.4
3	5601-5602	1.0	0.56	0.35	0.7	2.67	2.69	0	75.7
4	5602-5603	1.0	1.8	0.21	1.7	2.64	2.68	Tr.	51.8
5	5603-5604	1.0	14	5.7	1.5	2.63	2.67	0	38.0

===== C O M P L E T I O N D A T A =====

Total Depth: 5898' Driller equals 5905' Schlumberger equals 5900' Lane-Wells.
All measurements corrected to Lane-Wells.

Tested 5½" casing with 1000# for 30 minutes; held okay. Drilled out plug with 4 3/4" rock bit. Top cement at 5835 feet; float collar at 5845 feet, float shoe at 5879 feet. (Note: No cement from 5881 to 5900'; 19 feet of open hole.) Conditioned mud, 10.4# to 10.5# per gallon.

Ran Lane-Wells Gamma Ray and Neutron Logs with collar log; Perforated "B-1" Zone, 5720 to 5728', with 4 shots per foot; perforated "B-2" Zone, 5736 to 5746', with 4 jet shots per foot; all Lane-Wells measurements. Made three trips with Baker wire line junk basket. Ran Baker Model "D" #33 Production Packer on Lane-Wells wire line, set at 5765 feet.

Ran 191 joints, 5819.72 feet, 2 3/8", EUE, 4.70#, J-55, 8 rd. thd. R-2 American tubing, with 32.51 feet subs and dual equipment, landed 10.76 feet below RKB, spaced as follows:

Landed below RKB.....	10.76'
Top joint tubing.....	30.15'
1 sub.....	4.12'
1 sub.....	8.18'
1 sub.....	10.18'
1 sub.....	10.09'
190 joints tubing.....	5789.57'
Otis side-door choke nipple.....	1.34'
Baker latch-on sub.....	.67'

Top packer.....	5865.06'
2 Baker Seal nipples.....	2.17'
Blank flush joint.....	17.91'
Perforation.....	2.86'
1 Baker seal nipple.....	.82'
Flush joint with bottom orange peel welded.....	2.60'
Bottom of tubing.....	5891.42'

Displaced mud with water and water with oil. Acidized B Zones, 5720 to 5728' and 5736 to 5746 feet with 1000 gallons Dowell, 15% regular acid. Formation started taking acid at 1300#, 1/4 barrel per minute. Displaced 2.30 barrels per minute at 2700#. Final pressure after acidizing 1700#. Flowed acid 29 minutes; started showing oil in 45 minutes. Cleaned to pit; open flow from 2:00 A.M. to 6:00 A.M., average 25% salt water. Chlorides 100,000 ppm. From 6:20 A.M. to 7:20 A.M., 3-13-53, (1 hour), flowed into test tank, 24.76*barrels fluid, 6.19 barrels water (25%), and 18.57 barrels oil. Closed from 7:30 A.M. to 8:00 A.M. TSIP: 250# CSIP: 300#. Open to pit at 8:00 A.M. to 10:40 A.M., averaged 50% water. TFP: 0# CSIP: 200# Closed 10:40 A.M. to 12:15 P.M. TSIP: 400# CSIP: 600# Tubing open flow from 12:15 P.M. to 2:15 P.M., averaged 47% water; on 1/4" choke the tubing, from 2:50 P.M. to 6:00 P.M.; averaged 58% water throughout test.

Note: * - See last page of Completion Data for Production figures.

COMPLETION DATA

Stratafraced the "B-1" and "B-2" Zones with 1000 gallons of gel acid, followed with 2000 gallons 15% regular Dowell acid. Formation started taking acid at 1425#. Displaced 2.40 barrels per minute at 1950#. Minimum pressure, after displacing acid, 1550#. Flowed acid to surface in 13 minutes. Started showing oil and water in 34 minutes. Flowed to pit from 10:30 P.M., 3-13-53 to 6:00 A.M., 3-14-53 with 3/8" choke, averaged 50% water. Chlorides 105,000 ppm. TFP: 100# CSIP: 600# TSIP: 300#.

Acidized C Zone, 5879 to 5900 feet, with 1000 gallons regular 15% dowell acid. Broke formation at 3000#, maximum pressure. Displaced 3.10 barrels per minute at 2500#. Pressure bled back to 1500#. Flowed acid to surface in 11 minutes; started showing oil in 15 minutes. Cleaned to pit with 3/8" choke. TFP: 225#, 1/4" choke; TFP: 375# CSIP: 750#. Shut in 11:30 A.M. to 1:15 P.M. TSIP: 875# CSIP: 750#.

Tested C Zone tubing in test tank, 1 hour, 10/64" choke, TFP: 700# BS&W: 1% 16.52*barrels fluid. CSIP: 750# TSIP: 900#. Shut in 2:45 P.M., 3-14-53. Waiting on storage tanks. Released rig at 3:00 P.M., 3-14-53.

SUMMARY OF COMPLETION DATA

<u>Casing:</u>	Set 159 joints, 5871.70', of 5 1/2" casing set at 5884; cemented with 300 sacks cement, 2% gel.
<u>Tubing:</u>	Ran 191 joints, 5819.72 feet, 2 3/8" EUE tubing, with 32.51 feet subs and dual equipment, landed 10.76 feet below RKB; bottom of tubing 5891.42 feet.
<u>Packers:</u>	Baker Model "D" #33 Production Packer on Lane-Wells wire line, set at 5765 feet. 5865'
<u>Perforations:</u>	"B-1" Zone, 5720 to 5728, with 4 jet shots per foot; "B-2" Zone, 5736 to 5746, with 4 jet shots per foot; "C" Zone, open hole, 5881 to 5900.
<u>Acid Treatment:</u>	B Zones, 1000 gallons of regular acid. Stratafrac'd with 1000 gallons of gel acid followed with 2000 gallons of regular acid.. CC Zone, 1000 gallons of regular acid.
<u>Type Completion:</u>	DUAL: B Zone flowing through annulus. C Zone flowing through tubing.

Note: * - The Production for the first 2 hours was 41.18 barrels of fluid, of which 75% was oil; 25% emulsion.

MUD PROGRAM SUMMARY

Total Mud Additives Used: Baroid, 503 sacks; Aquagel, 193 sacks; Caustic Soda, 41 cans; Cottonseed Hulls, 14 sacks; Driscose, 15 sacks; Fibertex, 13 sacks; Tannex, 95 sacks; Barafos, 2 sacks.

Total Cost: \$4208.99
Total Drayage: 179.22

Total Mud Cost For Well: \$4388.21

Drilled surface hole with water to 1023 feet without difficulty. Set 9 5/8" casing at 1013 feet and cemented with 400 sacks regular cement. Drilled out from under surface pipe with water to a depth of 3900 feet where a Tannex-Caustic Soda treatment was started. Small additions of Driscose were made to control water loss as the well was drilled to a total depth of 5905'. Five and one-half inch, 5 1/2", casing was set at 5874' and cemented with 300 sacks regular, 2% gel cement, without difficulty. After drilling out plug and cement, it was necessary to add approximately 150 sacks of Baroid and 15 sacks of Aquagel to get mud back into shape for completion.

Mud characteristics while drilling this well were as follows:

<u>Depth</u>	<u>Weight, #/gal.</u>	<u>Viscosity, sec.</u>	<u>Water Loss, cc.</u>	<u>PH</u>
3740	10.3	35	11.8	7
4275	10.6	35	9.0	10
4918	10.5	49	12.0	10.5
5125	10.5	41	12.0	11
5680	11.0	41	13.0	11
5748	10.9	45	13.0	10.5

=====

SAMPLE DESCRIPTION

=====

- 0-2500 No Samples.
- 2500-2620 Shale, medium gray, soft; some gray shale with numerous tan, calcareous specks.
- 2620 Sample Top Graneros.
- 2620-2810 Shale, light to medium gray, soft, bentonitic.
- 2810 Sample Top Upper Muddy.
- 2810-2995 Shale, dark gray to black, firm; some soft, dirty gray siltstone.
- 2995 Sample Top Muddy Sand.
- 2995-3040 Sandstone, fine grained, salt and pepper appearance, porous, well sorted, rounded grains.
- 3040 Sample Top Skull Creek.
- 3040-3245 Shale, medium gray, medium hard, firm; some light gray, soft silt.
- 3245 Sample Top Dakota.
- 3245-3300 Sandstone, light gray to white, medium grained, porous, well sorted, well rounded; some medium gray, firm shale.
- 3300-3410 Shale, medium gray to black, firm, fissile; some medium grained, light gray, porous sandstone.
- 3410-3510 Sandstone, white to light gray, medium grained, porous, well sorted, well rounded; some black fissile shale.
- 3510-3550 Shale, dark gray to black, medium hard, firm, fissile; some light gray, porous, medium grained sandstone.
- 3550-3610 Sandstone, light gray, medium grained, porous, well rounded, well sorted; some black fissile shale.
- 3610 Sample Top Morrison.
- 3610-3635 Shale, dark gray to black, firm, medium hard, fissile.
- 3635 Sample Top Swift.
- 3635-3660 Sandstone, light gray, fine grained, well sorted, well rounded, glauconitic; some dark gray, carbonaceous shale; trace of light gray, calcareous shale.
- 3660-3690 Shale, dark gray to black, carbonaceous, splintery, slightly calcareous.
- 3690-3730 Depth Correction.

SAMPLE DESCRIPTION

- 3730-3830 Shale, dark gray to black, very firm, carbonaceous; some light gray, fine grained, porous, glauconitic sandstone.
- 3830-3950 Shale, as above.
- 3950-4000 Shale, as above with some light gray, very fine grained, porous, glauconitic sandstone.
- 4000 Sample Top Rierdon.
- 4000-4050 Sandstone, light gray, very fine grained, well cemented, calcareous; some dark gray, calcareous shale.
- 4050-4100 Shale, dark gray, slightly carbonaceous, splintery; some light gray, calcareous shale.
- 4100-4190 Shale, as above, with some light gray, fine grained, argillaceous sandstone.
- 4190-4350 Shale, light greenish-gray, splintery, very calcareous; trace of dense, amorphous, brown limestone.
- 4350 Sample Top Piper Shale.
- 4350-4420 Shale, reddish-brown, medium soft, very silty; trace of soft, white anhydrite.
- 4420 Sample Top Piper Limestone.
- 4420-4470 Limestone, brown, amorphous, dense; some light gray, splintery, calcareous shale; trace of soft, red, silty shale.
- 4470-4500 No Samples.
- 4500-4590 Shale, dark gray to black, chunky, very calcareous.
- 4590-4620 No Samples.
- 4620-4650 Shale, light brownish-gray, splintery, calcareous; trace of light gray, dense limestone; trace of medium gray, medium grained, porous sandstone.
- 4650 Sample Top Spearfish.
- 4650-4780 Sandstone, brownish-red, medium grained, anhydritic, argillaceous slightly calcareous, very slightly porous; trace of soft, red, shale; trace of light gray, dense limestone.
- 4780 Sample Top Amsden.
- 4780-4800 Dolomite, pink, fine crystalline, dense; trace of red, green and gray shale.
- 4800-4835 Shale, red, gray, green, purple variegated; ankertic; some light gray, amorphous, dense limestone.

SAMPLE DESCRIPTION

- 4835-4950 Limestone, light gray to white, fine crystalline, slightly porous; some red, green, gray variegated ankeritic shale; numerous fairly large angular to subrounded, clear quartz grains.
- 4950 Sample Top Heath.
- 4950-4970 Sandstone, light gray and red, medium to coarse grained, porous; angular; some red and gray variegated shale.
- 4970-5010 Shale, red, green and gray, medium hard, pyritic; variegated; trace of dense, light gray limestone at base.
- 5010-5030 Sandstone, light gray, coarse grained, angular to subrounded, porous, very slightly calcareous; some red and gray variegated shale; trace of dense, light gray limestone.
- 5030-5070 Shale, light gray, soft, slightly sandy; some red and gray variegated shale; trace of pyrite.
- 5070 Sample Top Otter.
- 5070-5100 Shale, light gray, soft, slightly sandy; some red and gray variegated shale; trace of vivid green shale; trace of light gray, dense limestone.
- 5100-5160 Shale, brown and gray, medium firm; some red and gray variegated shale; trace of green shale.
- 5160-5210 Limestone, brown, amorphous, dense, medium soft; some calcareous brown shale; trace of red, green and gray shale.
- 5210-5230 Shale, light gray, firm, calcareous, fissile; some dark red shale; trace of white anhydrite.
- 5230 Sample Top Kibbey Sand.
- 5230-5250 Silt, brownish-red, very soft, anhydritic; some soft red shale.
- 5250-5300 Sandstone, light gray and red, fine to medium grained, slightly calcareous, very porous and permeable; subrounded grains; some medium hard, gray shale.
- 5300-5375 Sandstone, red, fine to medium grained, porous, subrounded grains; some gray shale.
- 5375 Sample Top Kibbey Limestone.
- 5375-5380 Limestone, light gray, fine crystalline, dense; some red, fine grained sandstone.
- 5380-5410 Limestone, light gray, fine crystalline, very sandy, slightly porous; numerous medium to coarse sand grains; some dark gray shale.

SAMPLE DESCRIPTION

- 5410-5490 Sandstone, dark red, very fine grained, tight; anhydritic; some dark gray, firm shale.
- 5490-5510 Shale, dark gray to black, chunky.
- 5510 Sample Top Madison.
- 5510-5520 Anhydrite, white, soft; some dense brown limestone; some dark gray shale.
- 5520-5560 Dolomite, medium gray, fine crystalline, dense; some dark brownish gray, fine crystalline limestone; some soft, white anhydrite.
- 5560-5575 Limestone, dark brownish-gray, fine crystalline, dense; trace of soft, brown oolitic limestone; some light gray crystalline dolomite.
- 5575-5587 No Samples.
- 5587-5642 Core No. 1, recovered 55 feet.
- 5642-5680 Dolomite, light gray, microcrystalline, with some earthy, some dense brownish-gray limestone; some soft, white anhydrite.
- 5680-5690 Dolomite, light gray, earthy, sandy, with numerous fine to medium grains of quartz; trace of soft, white anhydrite; trace of brownish gray, dense limestone.
- 5690-5710 Limestone, brownish-gray, amorphous to microcrystalline; some light gray, earthy dolomite; trace of soft, white anhydrite.
- 5710-5750 Core No. 2, recovered 40 feet.
- 5750-5790 Dolomite, light gray, fine crystalline, very sandy, with numerous fine to medium quartz grains; some brownish-gray, amorphous limestone; trace of soft, white anhydrite.
- 5790-5850 Limestone, brownish-gray, dense, amorphous, slightly argillaceous; some light gray, fine crystalline dolomite; trace of soft, white anhydrite.
- 5850-5860 No Samples.
- 5860-5898 Core No. 3, recovered 26 feet.
- TOTAL DEPTH: 5898' Driller equals 5905' Schlumberger.

SERVICE & TESTING



WORKOVER HISTORY NO. 2

Well Lease and Number: East Poplar Unit No. 20
Field: East Poplar Unit County: Roosevelt State: Montana
Well Location: SW NE Section 14, T22N, R51E

STATUS PRIOR TO PRESENT JOB:

Date Completed: March 15, 1953 Date of Last Workover: April, 1963
T.D.: 5900' FETD: -- Producing Zone: "C" Zone
Perforations: "C" Zone Open Hole 5881-5900'
Cumulative Production of Present Zone: "C" Zone 245,203 BO, 702,792 BW
"B" Zone - 126,422 BO, 224,359 BW.

JUSTIFICATION FOR WORKOVER:

To fish tubing. Cut off tubing and release latch on Model "D" Production Packer to pull rod cut tubing.

SUMMARY OF WORKOVER:

- 11-29-65 5900' T.D. M.I.R.U. Pulling Unit. Pulled rods out of hole. Dia-Legged 2-7/8" tubing. Found 46 joints of condition No. 4 tubing in hole. Shut down overnight.
- 11-30-65 5900' T.D. Ran McCullough 1-3/4" O.D. Chemical Tubing Cutter. Attempted to cut tubing at 5850'. Could not work tubing loose. Ran McCullough Free Point Indicator. Found tubing free to top of Baker Model "D" Packer at 5865'. Ran McCullough 1-3/4" O.D. Chemical Tubing Cutter. Cut tubing at 5852'. Pulled same out of hole. Ran Acme Overshot with 2-3/8" Grapple. Shut down overnight.
- 12-1-65 5900' T.D. Finished going in hole with Overshot. Got over fish at 5852'. Set Grapple on 2-3/8" tubing. Rotated latch on out of Baker Model "D" Packer at 5865' W.L.. Pulled out of hole laying down 2-7/8" N-80 Tubing. Redressed Baker Seal Assembly. Shut down overnight.
- 12-2-65 5900' T.D. Ran tubing and rods with 2-1/2" x 2" x 18' Insert Pump in hole. TO DROP FROM REPORT.

RECAP OF WORKOVER:

Final Perforations: 5831-5900' (open hole) Unchanged
Final PRTD: 5900'
Test after Workover: 358 BFPD, 96% Water Cut
36 BOPD, 322 BWPD

Geologic Name of Producing Zone: "C" Zone

TUBING RECORD:

Below RXB	10.00
1 Jt. 2-7/8", 6.50#, J-55, 8rd. thrd., R-2 Tubing	29.56
3 2-7/8", 6.50# Tubing Subs	22.47
131 Jts. 2-7/8", 6.50#, J-55, 8rd. thrd., R-2 Tubing	3966.03
1 Seating Nipple	1110
1 Jt. 2-7/8", 6.50#, J-55, 8rd. thrd., R-2 Tubing	27.95
1 2-7/8" x 2-3/8" Regular Tubing Swedge	.68
59 Jts. 2-3/8", 4.70#, J-55, 8rd. thrd., R-2 Tubing	1803.51
1 Baker Locator Sub	1.11
1 1 Baker Seal Assembly	1.46
1 2-3/8" Baker Perf. Nipple Bull Plugged	13.35
Bottom of Tail Pipe	5877.22

Note: Latch on removed from Locator Sub.

ROD RECORD:

45 7/8" Scrappers	1125'
19 7/8" Plain	475'
95 3/4" Plain	2375'
	3975'

1 - 2-1/2" x 2' x 18' Insert Pump
Put on 30 brass rod guides

SUMMARY OF EPU NO. 20 - AFE NO. 3-1506

(Fishing Job)

Pulled rods and pump out of hole. Ran Dia-Log Caliper survey in 2-7/8" tbg.. Attempted to brake Baker Latch on and seal assemble out of Model D Packer. Pulled rod cut thd. out of collar at 3811'. Pulled tbg. out of hole, layed down rod cut joints. Ran tubing in hole, screwed into 2-7/8" collar. Attempted to back off 2-3/8" tbg. at 4506' with Dia-Log. Pulled collar off rod cut thd. at 3811'. Pulled tbg. out of hole. Ran HOMCO O.S. with 4½" wash pipe, went over top joint to fish and caught 2-7/8" collar. Picked up to set grapple and rotated tbg. to the right, broke Baker Latch on and seal assemble out of Model D Packer at 5865'. Pulled out of hole, redressed seal assemble. Ran same in hole. Spaced out tbg.. Ran 2½" x 2" x 18' insert pump spaced at 4014'. Started well pumping. Tbg. latched in Model D Packer with 18,000# strain. (Pump depth unchanged).

EPU No. 20 is a dual completed well in the B-1 & 2 Zone comingled and C-Zone with a Model D Packer between the B & C Zones and pumping from the C Zone only at the rate of 53 BOPD, 329 BWPD (test date 4-9-63 after fishing job).



BOTTOM HOLE PRESSURE SURVEY

(Static)

Date March 28, 1953

Company Murphy Corporation Field East Poplar Unit Lease and Well No. 20

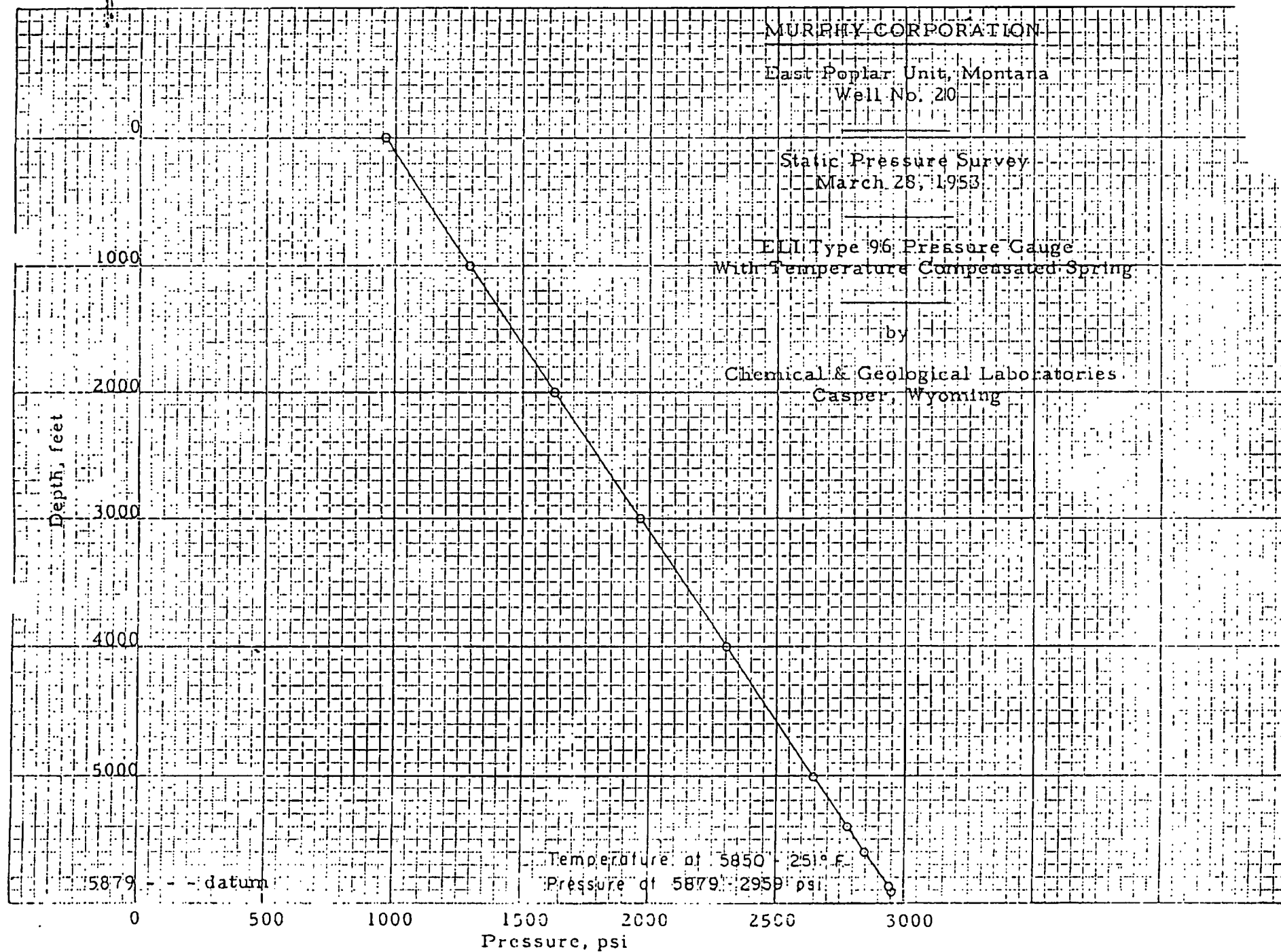
Location SW NE 14-28N-51E County Roosevelt State Wyoming

WELL DATA:

Elevation: 2210 KB Datum Point: 5879
 Formation: Mississippian Perforation: open hole (C zone)
 T. D.: 5900 Tubing Press: 960
 Casing: 7" OD @ 5879 Casing Press:
 Tubing: 2 1/2" EUE @ 5865 on packer.

<u>Depths</u>	<u>Extension Inches</u>	<u>Pressure</u>	<u>Gradient #/100'</u>	<u>Additional Information</u>
Top Hole	1.242	960 psi		
1000	1.689	1291	33.1	
2000	2.143	1627	33.6	
3000	2.606	1969	34.2	
4000	3.068	2311	34.2	
5000	3.526	2650	33.9	
5400	3.708	2785	33.8	
5600	3.802	2854	34.5	
5850	3.928	2948	37.6	
5879		2959	extrapolated	

Remarks: All measurements from K.B.
 Temperature at 5850. - 251°F.
 Water in diaphragm of bomb.
 Well shut in 14 days.



C. A. WHITE
Sales and Service
Eng. Dept.
B-1032

SUB-SURFACE SURVEY
FLOWING CURVE
AND
BUILD UP CURVE

Company THE MURPHY CORPORATION EAST POPLAR

Lease and Well NO. 20

County ROOSEVELT

State MONTANA

Date MARCH 1, 1956

T. D. 5900' PLUS

Formation

Elevation 2210' R.Z.E.

Casing 5 $\frac{1}{2}$ " O.D.

Perforation 5881'-5900'

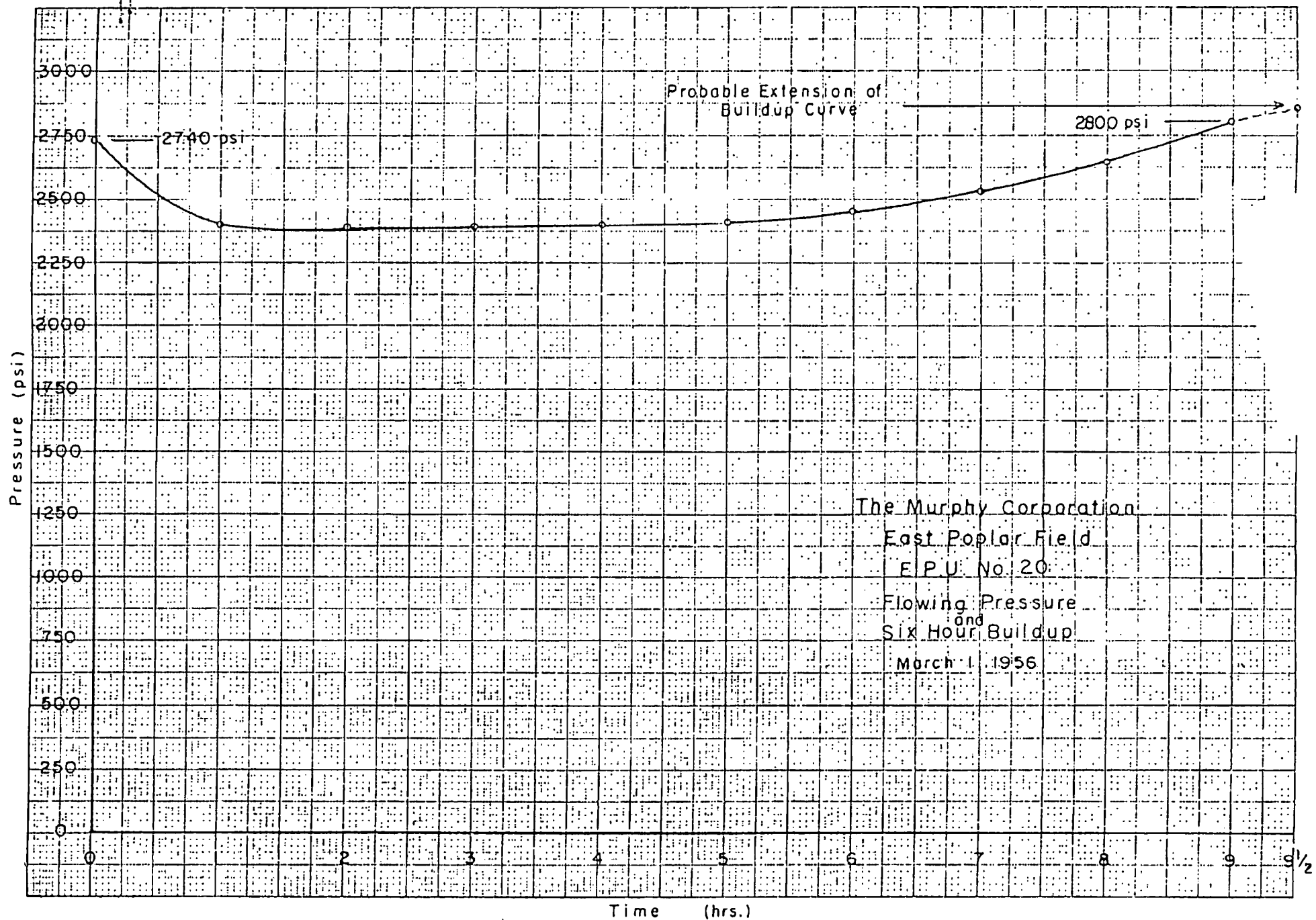
Tubing 2" 5900' PLUS-OPEN ENDED

Datum Point 5663'

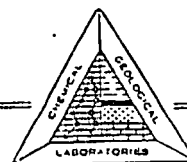
<u>DEPTH (ft)</u>	<u>TIME (hrs)</u>	<u>EXTENSION (in)</u>	<u>PRESSURE (psi)</u>
5663.	0 hours.	2.760.	2740
5663.	1 hours.	2.435.	2422
5663.	2 hours.	2.433.	2421
5663.	3 hours.	2.430.	2420
5663.	4 hours.	2.406.	2405
5663.	5 hours.	2.456.	2440
5663.	6 hours.	2.474.	2460
5663.	7 hours.	2.550.	2536
5663.	8 hours.	2.664.	2650
5663.	9 hours.	2.820.	2800

REMARKS:

1. Well shut in 6 hours prior to test.
2. Flowed well on $\frac{16}{64}$ " choke for 1 hour.
3. Flowed well on 1" choke for 2 hours.
4. Shut in and building up for 6 hours.



CHEMICAL & GEOLOGICAL LABORATORIES OF MONTANA



CHEMISTS GEOLOGISTS ENGINEERS

113 WEST BELL
GLENDALE, MONTANA

THE MURPHY CORPORATION

WELL NO. # 20 UNIT

EAST POPLAR FIELD

MARCH 6, 1953

CORE ANALYSIS REPORT

521 South Center St. P. O. Box 279
Casper, Wyoming

Field East Poplar County Roosevelt State Montana
Well No. 4-20 Unit Location C SW NE 14-28N-51E
Formation A = Zone Depths 5599 - 5634
Operator Murphy Corporation Elevation 2199 GR Lab. No. 25

Cored with	from .. 5599 ..	to ... 5634 ..
Footage of formation cored.....		26
Feet of core received at laboratory for analysis		26
Feet of core not accounted for.....		-
<hr/>		
Number of representative samples selected for analysis		26
Feet of core represented by selected samples		26

ROCK CHARACTERISTICS	FEET OF CORE	
	Analyzed	Not Analyzed
Shale and/or dense barren material	6	
Fractured material.....		
Non-fractured material.....	20	
TOTAL.....	26	

REMARKS

CHEMICAL & GEOLOGICAL LABORATORIES

521 South Center St. P. O. Box 279

Casper, Wyoming

FULL DIAMETER CORE STUDY

Operator Murphy Corporation Field East Poplar Formation A - Zone
 Well No. # 20 Unit Location C SW NE 14-28N-51E Depths 5599-5604
 Elevation 2199 Gr. Date March 6, 1953 Lab. No. 25

Sample No.	Representative of Feet	Footage	Permeability		Effective Porosity %	Density		Saturation % of Pore Space		Description
			Radial	Vertical		Bulk	Matrix	Residual Oil	Water	
1	5599-5600	1.0	3.6	0.08	1.2	2.69	2.73	Tr.	65.8	VC, D
2	5600-5601	1.0	13	3.9	3.8	2.61	2.71	0	22.4	VC, SV, ST
3	5601-5602	1.0	0.56	0.35	0.7	2.67	2.69	0	75.7	C, D
4	5602-5603	1.0	1.8	0.21	1.7	2.64	2.68	Tr.	51.8	C, SV, D
5	5603-5604	1.0	14	5.7	1.5	2.63	2.67	0	38.0	C, SV, D

VC - Vertical Crack
 D - Dense
 SV - Slightly Vuggy
 C - Cracked

CHEMICAL & GEOLOGICAL LABORATORIES

521 South Center St. P. O. Box 279
Casper, Wyoming

Core Analysis Report

Field East Poplar
Operator Murphy Corporation

Well No. 25

Laboratory No. 25

SUMMARY OF REPORT

DISTRIBUTION BY MAXIMUM PERMEABILITY RANGES

Permeability Range	Footage	Permeability	Porosity	Water Saturation	Residual Oil Saturation
Less than 0.01					0.0
0.01 - 0.09	1.0	0.56	0.7	75.1	Tr
0.10 - 0.99	2.0	2.70	1.5	58.8	0.0
1.00 - 9.9	2.0	13.5	2.65	30.2	
10 - 99					
100 - 999					
1,000 +	5.0				
Total summarized	5.0				
Total analyzed					
0.01 +	5.0	6.59	1.78	50.7	Tr
0.10 +	4.0	8.1	2.05	44.5	Tr
1.00 +	2.0	13.5	2.65	30.2	0
10 +					
100 +					
1,000 +					

Total porosity-feet

Total millidarcy-feet of 0.1 md. and above

Mean matrix density

Remarks:

8.9

32.96

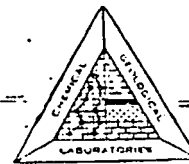
2.70

CHEMICAL & GEOLOGICAL LABORATORIES OF MONTANA

CHEMISTS

GEOLOGISTS

ENGINEERS



113 WEST BELL
GLENDALE, MONTANA

March 6, 1953

Murphy Corporation
El Dorado
Arkansas

Zone - A

Gentlemen:

The weighted average radial permeability of this section is 6.59 millidarcies, and the weighted average porosity is 1.78 percent.

This section showed low porosity with a trace of oil staining.

Yours very truly,

CHEMICAL & GEOLOGICAL LABORATORIES OF MONTANA

J. Allan MacTaggart
J. Allan MacTaggart

JAM:ml

CHEMICAL & GEOLOGICAL LABORATORIES OF MONTANA

113 West Bell
Glendive, Montana

CORE ANALYSIS REPORT

Log: 5620

Company: Murphy Corporation Date: March 8, 1953 Lab. No. 25
Well No. Unit # 20 Location: C SW NE 14-28N-51E
Field: East Poplar Formation: "A" "B-1" "B-2" "C"
County: Roosevelt Depths: 5613 - 5886
State: Montana Drilling Fluid: Mud

C—Crack
F—Fracture
H—Horizontal
O—Open

LEGEND
NF—No Fracture
IS—Insufficient Sample

S—Slight
St—Stain
V—Vertical
Vu—Vugs

SAMPLE NO.	LEGEND	DEPTH, FEET	EFFECTIVE POROSITY % PORESPACE	PERMEABILITY MILLIGARCIES		SATURATIONS		CONNATE WATER	SOLUBILITY	
				HORIZONTAL	VERTICAL	% PORE SPACE RESIDUAL OIL	% PORE SPACE TOTAL WATER		MUD ACID	15 % ACID
Zone "A"										
6	C, I, St	5613-14	14.8	44		Tr	17.3			
7	C, Sty, St	14-15	13.8	277		0.0	12.8			
8	C, I, St	15-16	7.6	2.3		10.2	89.2			
9	C, I, St	16-17	12.4	61		6.7	53.1			
10	C, I, St	17-18	15.7	52		1.9	24.5			
11	C, I, St	18-19	16.7	158		6.9	30.7			
12	C, I, St	19-20	6.3	2.3		8.7	72.3			
13	Sty, I, St	20-21	8.2	21		7.3	86.9			
14	C, I, St	21-22	6.6	38		14.1	73.6			
15	C, I, St	22-23	12.8	0.58		6.6	69.6			
16	C, Shy, I, St	23-24	3.6	0.05		Tr	93.3			
17	C, I, St	24-25	1.7	0.01		26.0	69.6			
18	I, St	25-26	13.4	5.9		15.1	40.7			
19	I, Shy, St	26-27	3.0	3.7		14.7	67.3			
20	C, I, St	27-28	5.1	0.14		22.5	75.1			34.1 1 2 P
21	I, St	28-29	7.5	0.05		19.9	77.2			
22	I, St	29-30	14.5	77		18.4	57.7			
23	I, St	30-31	10.0	3.1		2.7	47.2			
24	C, I, St	31-32	24.0	56		4.9	23.1			
25	C, I, St	32-33	7.4	21		9.2	30.9			
26	C, I, Any	33-34	0.4	12		0.0	20.0			
Zone "B-1"										
27	VF, St, I	5718-19	8.6	0.21		11.6	31.4			
28	St, I	19-20	17.5	5.8		18.9	26.3			
29	VF, St, I	20-21	9.6	0.38		17.7	29.2			
30	C, St	21-22	4.6	0.72		1.9	76.1			
31	VC, St	22-23	6.1	0.58		7.9	65.6			
32	S Vu, St, I	23-24	15.1	13		15.9	14.6			
33	HC, St, I	24-25	12.3	7.5		26.0	26.8			
34	VC, St, I	25-26	8.0	3.1		17.5	40.0			
Zone "B-2"										
35	S Vu, St	5735-36	16.7	2.7		11.4	16.8			
36	St, I	36-37	17.2	14		13.4	34.3			
37	VF, St, I	37-38	11.6	2.9		23.3	31.0			
38	VC, St, I	38-39	14.2	8.2		20.4	38.7			
39	C, St	39-40	3.0	0.09		16.3	66.7			
40	VC, St, I	40-41	9.9	1.3		9.6	19.2			

34
1/2

C—Crack
F—Fracture
H—Horizontal
O—Open

LEGEND
NF—No Fracture
IS—Insufficient Sample

S—Slight
St—Stain
V—Vertical
Vu—Vugs

SAMPLE NO.	LEGEND	DEPTH, FEET	EFFECTIVE POROSITY % PORESPACE	PERMEABILITY MILLIDARCIES		SATURATIONS		CONNATE WATER	SOLUBILITY	
				HORIZONTAL	VERTICAL	% PORE SPACE RESIDUAL OIL	% PORE SPACE TOTAL WATER		MUD ACID	15 % ACID
41	Sty, St	5741-42	2.2	I.S.		13.6	81.8			
42	St, I	42-43	8.0	1.1		13.8	27.5			
43	St, I	43-44	12.8	3.2		8.6	10.9			
44	St	44-45	10.4	1.1		21.2	21.2			
45	St	45-46	12.9	4.9		13.2	31.8			
46	S Vu, St	46-47	6.1	1.2		23.0	18.0			
47	St	47-48	16.8	9.1		13.7	25.6			
48	St	48-49	9.5	3.3		6.1	21.1			
49	VF, St	49-50	1.8	0.62		20.6	30.0			
Zone "C"										
50	C, I, St	5879-80	2.4	-0.01		4.2	70.8			
51	C, I, St	80-81	11.8	0.18		18.6	18.6			
52	C, I, St	81-82	15.3	0.31		29.4	20.9			
53	C, I, St	82-83	14.5	0.07		34.5	28.3			
54	C, I, St	83-84	15.3	0.21		26.1	29.4			
55	I, St	84-85	2.0	0.01		Tr	45.0			
-	-	85-86 ?	-	-		-	-			

DOWELL INCORPORATED

STAGE

TREATMENT NO.

TREATMENT REPORT

DISTRICT #2 Wichita STATION Williston N.D. DATE 3-12-, 1953

OWNER C. H. Murphy LEASE Unit WELL NO. 20
POOL E. Poplar COUNTY Roosevelt STATE MONTANA
LOCATION C SW NE 14-28N-51E OWNER'S REPRESENTATIVE Mr. James

WELL DATA

FORMATION MADISON
PAY-FROM 5720 TO 5728
PRESENT TOTAL DEPTH 5905 P. B. FROM

PIPE DATA-
CASING SIZE 5 1/2 WT. 15.5
CASING DEPTH SKS. CEMENT
LINER SIZE WT.
LINER DEPTH-FROM TO
LINER DESCRIPTION
TUBING SIZE 2" Eve DEPTH 5865
PACKER-TYPE BAKER DEPTH 5765
PACKER FURNISHED BY OPERATOR yes DOWELL

PERFORATING DATA OR PAY ZONES

SHOTS/FT.	FROM	TO
<u>32/4</u>	<u>5720</u>	<u>5728</u>

PRODUCTION-

	OIL	WATER	G. O. R.
INITIAL			
PRESENT	<u>-</u>	<u>-</u>	

ACIDIZING, SHOOTING AND LOGGING RECORD-

COMPLETION DATA-

DATE NEW CABLE TOOL
ROTARY yes DRILLING FLUID Mud
SIZE OPEN HOLE

DETAILED RECORD OF TREATMENT

TIME		PRESSURE		REMARKS			
A.M. OR P.M.	CASING	TUBING					
<u>10:00 AM</u>				<u>ARRIVAL AT LOCATION WITH 1000 GALS. OF DOWELL XF32W9</u>			
<u>9:30 PM</u>				<u>St. water To Circulate</u>			
<u>10:30</u>				<u>St. oil To Circulate</u>			
<u>12:15</u>				<u>St. 1000 gal. Dowell XF32W9 (Hole Full oil)</u>			
<u>12:38 800</u>	<u>100</u>			<u>Acid on bottom - Close Csg.</u>			
				<u>BBLs. OF ACID</u>			
<u>12:40</u>	<u>800</u>	<u>100</u>	<u>24</u>	<u>IN FORMATION</u>	<u>PER READING</u>	<u>PER MINUTE</u>	<u>St. oil To Flush</u>
<u>12:50</u>	<u>2000</u>	<u>1300</u>		<u>2</u>	<u>2</u>	<u>.2</u>	<u>Speed Pump - Feeding</u>
<u>12:53</u>	<u>2700</u>	<u>2350</u>		<u>9</u>	<u>7</u>	<u>2.3</u>	
<u>12:55</u>	<u>2700</u>	<u>2500</u>		<u>13</u>	<u>4</u>	<u>2</u>	
<u>1:00</u>	<u>2700</u>	<u>2700</u>		<u>24</u>	<u>11</u>	<u>2.2</u>	<u>Flush Complete</u>
<u>1:02</u>	<u>1700</u>	<u>1700</u>					<u>2 min - Pressure Drop.</u>

LEFT LOCATION

IF TREATMENT IS NOT CONVENTIONAL LIMESTONE FORMATION TREATMENT TO INCREASE OIL OR GAS PRODUCTION, STATE PURPOSE OF TREATMENT.

A

R. C. Abernethy

SERVICE ENGINEER

DISTRICT OFFICE COPY.

STATION OR DISTRICT MANAGER

DOWELL INCORPORATED

TREATMENT NO.

TREATMENT REPORT

DISTRICT #2 Wichita STATION Williston N.D. DATE 3-14, 1953

OWNER C. H. Murphy LEASE Unit WELL NO. 20
POOL E. Poplar COUNTY Roosevelt STATE Mont.
LOCATION C-5W-N2-14-28N-51E OWNER'S REPRESENTATIVE Mr. James

WELL DATA

FORMATION MADISON
PAY-FROM _____ TO _____
PRESENT TOTAL DEPTH 5905 P. B. FROM _____

PIPE DATA-

CASING SIZE 5 1/2 WT. 15 1/2
CASING DEPTH 5905 SKS. CEMENT 300
LINER SIZE _____ WT. _____
LINER DEPTH-FROM _____ TO _____
LINER DESCRIPTION _____
TUBING SIZE 2 3/8 DEPTH _____
PACKER-TYPE Baker DEPTH _____
PACKER FURNISHED BY OPERATOR _____ DOWELL _____

PERFORATING DATA OR PAY ZONES

SHOTS/FT.	FROM	TO

PRODUCTION-

	OIL	WATER	G. O. R.
INITIAL			
PRESENT			

ACIDIZING, SHOOTING AND LOGGING RECORD-

COMPLETION DATA-

DATE New CABLE TOOL _____
ROTARY yes DRILLING FLUID MUL
SIZE OPEN HOLE _____

DETAILED RECORD OF TREATMENT

TIME	PRESSURE	REMARKS	
A.M. OR P.M.	CASING	TUBING	
<u>9:00 AM</u>			ARRIVAL AT LOCATION WITH <u>1000</u> GALS. OF DOWELL <u>XF32W9</u>
<u>10:00</u>			<u>St. 1000 gal. Dowell XF32W9</u>
			FILL _____ BBLs.
			BLEED <u>22</u> BBLs.
			FLUSH <u>24</u> BBLs.

TIME	PRESSURE	OUT OF TANKS	BBLs. OF ACID			REMARKS
			IN FORMATION	PER READING	PER MINUTE	
<u>10:15</u>	<u>600</u>	<u>900</u>	<u>12</u>	-	-	<u>Acid on bot. Close csg. Set Packer</u>
<u>10:30</u>	<u>600</u>	<u>900</u>				<u>St. Displacement</u>
<u>10:33</u>	<u>600</u>	<u>3000</u>	<u>1</u>	<u>1</u>	<u>.8</u>	
<u>10:35</u>	<u>600</u>	<u>2800</u>	<u>2</u>	<u>1</u>	<u>.5</u>	<u>St. oil to Flush</u>
<u>10:40</u>	<u>600</u>	<u>2800</u>	<u>12</u>	<u>10</u>	<u>2.</u>	
<u>10:44</u>	<u>600</u>	<u>2500</u>	<u>24</u>	<u>12</u>	<u>3</u>	<u>St. over flush - 2 bbl.</u>
<u>10:45</u>	<u>600</u>	<u>2500</u>	<u>26</u>	<u>2</u>	<u>2.</u>	<u>Flush Complete</u>
<u>10:46</u>	<u>600</u>	<u>1500</u>				<u>1 min. Press. Drop - Shut in</u>

LEFT LOCATION

IF TREATMENT IS NOT CONVENTIONAL LIMESTONE FORMATION TREATMENT TO INCREASE OIL OR GAS PRODUCTION, STATE PURPOSE OF TREATMENT.

P. C. Abernethie

SERVICE ENGINEER

STATION COPY.

STATION OR DISTRICT MANAGER

**NALCO CHEMICAL COMPANY**

P.O. BOX 87 • SUGAR LAND, TEXAS 77478 • AREA 713-494-9141

January 17, 1977

Murphy Oil Corporation
P.O. Box 547
Poplar, Montana 59255

Attention: Billy McLearn

Dear Billy,

It is my findings that your downhole scale deposition on E.P.U. #20 is being caused by many factors. And usually by more than one at a time. Your high bottom hole temperature drives off CO₂ to release calcium carbonate deposits...pressure changes can cause a stable water to deposit scale...also with the high P.H. of your water the likihood of forming calcium carbonate scale increases. For these above reasons I feel an effective scale control program would be very essential on your lease E.P.U. # 20.

The following steps should be followed for a scale formation squeeze.

1. Mix four drums of Visco 957 in 35 barrels of produced water. Fresh Water can be used also.
2. Inject ahead or preflush with five to ten barrels of produced water.
3. Follow with chemical-water mixture.
4. Displace out the bottom of the tubing or casing.
5. Overflush with ³⁵⁰250 barrels of produced water.



NALCO CHEMICAL COMPANY

P.O. BOX 87 • SUGAR LAND, TEXAS 77478 • AREA 713-494-9141

6. Do not exceed formation pressure while pumping.

7. Leave the well shut in for at least 24 hours.

Chemical residuals will determine when the well should be re-squeezed.

Thank you again for your interest in Nalco Chemical.

Best Regards,

Bob Gray
District Salesman
Nalco Chemical Company

cc: Terry Huff

D.C. Johnson



ANALYTICAL SERVICE LABORATORY REPORT

WATER ANALYSIS

Company: MURPHY OIL COMPANY
POPLAR, MONTANA
DISTRICT 20-8

Date Printed 25-Jan-77
Analysis No. 77V55
Date Sampled 1-13-77
Date Received 1-17-77

Sample Marked: E.P.U. #20

WATER ANALYSIS			RESULTS AS COMPOUNDS	
DISSOLVED SOLIDS	mg/l	meq/l		mg/l
CATIONS				
Sodium, Na(calc.)	48500.	2110.		
Calcium, Ca	1400.	70.0	as CaCO ₃	3500.
Magnesium, Mg	146.	12.0	as CaCO ₃	600.
Barium, Ba	.0	.0	as BaSO ₄	.0
Sum of Cations	50100.	2190.		
ANIONS				
Chloride, Cl	76500.	2150.	as NaCl	126000.
Sulfate, SO ₄	1550.	32.4	as Na ₂ SO ₄	2300.
Carbonate, CO ₃			as CaCO ₃	
Bicarbonate, HCO ₃	264.	4.3	as CaCO ₃	216.
Sum of Anions	78300.	2190.		
TDS CALCULATED	128000.			
Total Iron, Fe	.7	.0	as Fe	.7
Acid to Phen, CO ₂	4.4	.1	as CaCO ₃	10.0
OTHER PROPERTIES			CaCO ₃ STABILITY (Index)	CaSO ₄ SOLUBILITY (meq/l)
pH (units)	7.5		@ 70F	
Spec Gravity	1.096		@ 120F	
Turbidity (Jtu)	4.0		@ 170F	

Remarks:

3 R. J. GRAY ✓
D. C. JOHNSON
L. L. HAWKINS

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NALCO CHEMICAL COMPANY
REGIONAL ANALYTICAL LABORATORIES

Box 127
Anaheim, CA 92805

6216 W. 66th Place
Chicago, Illinois 60638

Box 16A
Paulsboro, NJ 08066

Box 87
Sugar Land, TX 77478



NALCO CHEMICAL COMPANY

P.O. BOX 87 • SUGAR LAND, TEXAS 77478 • AREA 713-494-9141

February 9, 1977

Murphy Oil Corp.
P.O. Box 547
Poplar, Montana 59255

Attention: Billy McLearn

Dear Billy,

Attached is the water analysis I ran on E.P.U.#20 as the analysis shows there is very little free CO_2 to keep bicarbonates from precipitating out as scale deposits.

Thank you for letting Nalco Chemical and myself be of service to you and Murphy Oil.

Sincerely,

Bob Gray

District Salesman

Nalco Chemical

BG/vg

cc: Terry Huff

D.C. Johnson



Date Sample Rcc'd 3- 4-77

QUANTITY REPORTED AS Mg/L

* None Detected

Chemist

P. O. BOX 117 • SUGAR LAND, TEXAS 77470



REPORT OF MULTIPLE ANALYSIS

From Murphy Oil Corporation
Polar, Montana

Date 3-1-77
Analysis No. 77V-289
Date Sample Rec'd 2-18-77

QUANTITY REPORTED AS Mg/L

Sample Number	Sample Marked	Sample Date		VISCO 957		
A	E.P.U. #20	2-3-77		3.8		
<div>5/100 lbs 18 69 50</div> <div>R. J. Gray (5) ✓ D. C. Johnson lms</div>						

R. D. George

Chemist

NALCO CHEMICAL COMPANY
VISCO CHEMICALS

P. O. BOX 87 • SUGAR LAND, TEXAS 77478



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NALCO CHEMICAL COMPANY

ENERGY NO. 1 BLDG. & 107 WERNER COURT & CASPER, WYOMING 82601 & AREA 307-266-1533

PETROLEUM AND PROCESS CHEMICAL DIVISION

VISCO CHEMICALS

March 7, 1977

Murphy Oil Corp.
P.O.Box 547
Poplar, Montana 59255

Attention: Billy MeLear

Dear Billy,

Attached is the phosphate residual on the EPU # 20 lease.

Thank you for letting Nalco Chemical and myself be of service to you and Murphy Oil.

Sincerely,

Bob Gray
District Salesman
Nalco Chemical

BG/vg

cc: T. Huff
D.C. Johnson



REPORT OF MULTIPLE ANALYSIS

From Murphy Oil Corporation
Poplar, Montana

Date 3-17-77

Analysis No. 77V-333

Date Sample Rec'd 2-25-77

QUANTITY REPORTED AS Mg/L

Sample Number	Sample Marked	Sample Date	VISCO 957		
A	E.P.U. # 20	2-7-77	8.5		
B	E.P.U. # 20	2-14-77	3.7		
R. J. Gray (5) ✓ D. C. Johnson					

R. D. George

/lms

Chemist

NALCO CHEMICAL COMPANY
VISCO CHEMICALS

P. O. BOX 87 • SUGAR LAND, TEXAS 77478



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NALCO CHEMICAL COMPANY

ENERGY NO. 1 BLDG. • 107 WERNER COURT • CASPER, WYOMING 82601 • AREA 307-266-1533

March 29, 1977

Murphy Oil Corp.
P.O. Box 547
Poplar, Montana 59255

Attention: Billy G. MeLear

Dear Billy,

Please find the attached the phosphate residuals
ran on the E.P.U. #20.

Thank you for letting Nalco Chemical and myself be
of service to you and Murphy Oil.

Sincerely,

Bob Gray
Bob Gray
District Salesman
Nalco Chemical
BG/vg

cc: Terry Huff
D.C. Johnson



NALCO CHEMICAL COMPANY

ENERGY NO. 1 BLDG. • 107 WERNER COURT • CASPER, WYOMING 82601 • AREA 307-266-1533

PETROLEUM AND PROCESS CHEMICAL DIVISION

VISCO CHEMICALS

April 5, 1977

Murphy Oil Corp.
P.O. Box 547
Poplar, Montana 59255

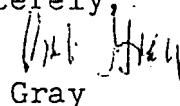
Attention: Billy MeLear

Dear Billy,

Please find attached the multiple analysis report
on the E.P.U. #20, we are still getting back a good
amount of 957 residual.

Thank you for letting Nalco and myself be of service
to you and Murphy.

Sincerely,


Bob Gray

District Salesman

Nalco Chemical

BG/vg

cc: T. Huff

D.C. Johnson

PRODUCTION &
INJECTION DATA



PLUGGING &
ABANDONMENT